Founded in 1832

RAILWA

# OCOMOTIVES AND ARS

SEPTEMBER 1956

One of Five Specialized Railway Age Publications

## FR-16

the finest in rubber draft gears



W. H. MINER, INC.

CHICAGO

## COMING INTO THE PICTURE

/

Introduced at the Allied Conventions in 1955.



Set new Standards for Freight Train Braking in Drag, Emergency Breakaway and Road Tests.



The first equipped car in regular service on public exhibit in Chicago in June 1956 drew record crowds at La Salle Street Station.

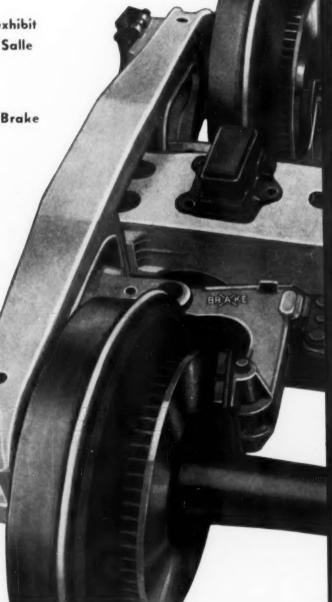


More than a dozen top railroads will have Disc Brake Cars in regular Freight Train Consists by 1957.

T'L BUFFALO BRAKE

THE New STANDARD FOR FREIGHT TRAIN BRAKING





BUFFALO BRAKE BEAM COMPANY

NEW YORK

## Just One Idea!

taken from this
FREE 56 page booklet
can save money
for your road
...help do many
maintenance jobs easier,
faster, safer

Between the covers of this 56-page booklet you will find described and illustrated many job-tested cleaning short-cuts. It's the kind of practical, down-to-earth information that can lead to better maintenance and overhaul of steam and Diesel power.

#### You can be Sure of the BEST in Railroad Cleaning . . .

... by sending for this FREE Booklet. And by making full use of Oakite Technical Advisory Service in terminal or shop. Constructive literature and conscientious service is available to you immediately without cost or obligation. Consult Oakite today!



You can learn how to speed up and simplify jobs such as these:

- · Cleaning Journal Boxes
- Cleaning and Rust-Proofing Roller Boarings by New, Mechanized Mass Production Method
- . Semi-Automatic Cleaning of Running Gear
- · Filter Cleaning
- · Coach Washing . . . Manual and Mechanical

OAKITE PRODUCTS, INC., 48 Rector Street, NEW YORK 6, N. Y.
In Canada: Oakite Products of Canada, Ltd. 65 Front St. East, Toronto, Ont.

OAKITE

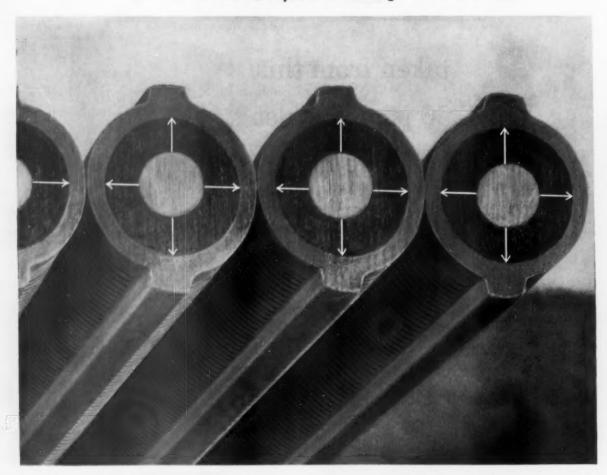
MATERIALS - METHODS - SERVICE

SCIENCE

RAILWAY DIVISION

## **EXIDE-IRONCLAD BATTERIES**

For railway diesel starting



## Power tubes expand without shedding — preserve battery life



Every time you discharge a storage battery, the active material on the positive plates expands. But the plate grids don't expand. This is basic.

On most batteries, the expanding active material tends to shear off from the nonexpanding grid every time the action takes place. But this can't happen in the Exide-Ironclad Battery. The reason is simple.

Active material is formed concentrically around the spinelike grid and held inside the plastic tubes. Expansion is predominantly in an outward direction—hence no shearing. Active material remains firmly locked to the underlying grid structure. And the flexible plastic tubes yield and take up as needed.

This extra protection against shedding of active material is only one of the many reasons for the long life of Exide-Ironclad Batteries. When you order heavy duty batteries, or the equipment requiring them, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.



#### PUBLISHED MONTHLY BY THE

#### SIMMONS-BOARDMAN

#### PUBLISHING CORPORATION

#### EDITORIAL AND EXECUTIVE OFFICES:

30 Church Street, New York 7 79 West Monroe St., Chicago 3

#### ROBERT G. LEWIS

Publisher, New York

#### H. C. WILCOX

Editor, New York

#### A. G. OEHLER

Electrical Editor, New York

#### G. J. WEIHOFEN

Western Editor, Chicago

#### F. N. HOUSER, JR.

Associate Editor, New York

#### J. F. BERGE

Associate Editor, New York

#### LILLIAN D. MILNER

Editorial Assistant, New York

#### C. W. MERRIKEN, JR.

Business Manager, New York

#### MICHAEL J. FIGA, JR.

Director of Production, New York

#### BRANCH OFFICES:

1081 National Press Bldg. Washington 4, D. C. Terminal Tower Clevelond 13 214 Terminal Sales Bldg. Partland 5, Ore. 244 California Street San Francisco 4 1127 Wilshire Blvd. Los Angeles 17 3908 Lemmon Ava. Dallas 19, Tex.

#### FOREIGN REPRESENTATIVES.

Sibley-Fields Publishing Company, Ltd. 48 London Wall, Lendon E.C. 2, England Linder Presse Union GMBH International Advertising Agency (16) Frankfurf a.Main Wittelsbacher Allee 60, West Germany





Railway Locamatives and Cars is a member of the Associated Business Papers (A.B.P.) and the Audit Bureau of Circulation (A.B.C.) and is indexed by the Industrial Arts Index and also by the Engineering Index Service, Printed in U.S.A.

# PAILWAY OCOMOTIVES AND ARS

Founded in 1832 as the American Rail-Road Journal

CE	DTE	44 B	EB	195	24

**VOLUME 130, No. 9** 

#### LAMENTS AND CHEERS

4

#### EDITORIALS

51

#### MOTIVE POWER AND CAR

What's in Today's Mechanical Reefer?	55
How SAL Applied New Box Car Sheathing	60
Largest G.E. World-Market Road Switcher	61
Let's Be Logical About Diesel Maintenance	64
Reclaiming Roller Bearing Boxes	66
Programs Coordinated Mechanical Associations	67
Ideas for the Car Repair Man	69
24 RL Air Brake Valves (Air-Brake Schematics in Color)	71

#### ELECTRICAL SECTION

Power for the Self-Contained Car	75
Up-Ender Turns Armatures	78
Freight Train Performance Analyzer	79
Battery Shipping Container	80
Japan Adopts 60-Cycle Electrification	81
Tach Generator Magnetism	82
Portable Work Bench for Electricians	82

#### DEPARTMENTS:

New Books	6
Equipment New Ideas—New Uses	10
News	16
Personal Mention	16
Problem Page	86
Questions and Answers	88
Supply Trade Notes	94
Index to Advertisers	114

Published monthly by the Simmons-Boardman Publishing Corporation at 1339 Noble St., Philodelphia, Pa. Entered as second-class matter, January 16, 1933, at the Post Office at Philodelphia, Pa., under the act of March 3, 1879. Subscription Price to Iralizod employees only in U. 5. passessions and Conado. \$2 are year, \$3 teb years, payable in advance and postage free. Subscription price to railroad employees eisewhere. \$8 per year. Single copies, 504. Address correspondence concerning subscriptions to R. C. Van Piess, director of circulation, 30 Church 5t., New York 7. Simmons-Boardman Publishing Carporation, James G. Lyne, President, New York; Samuel O. Durin, Chairman Emeritus, Chicago; Fred A. Clark, Vice-Pres, Clevaland, C. Wherriken, Vice-Pres, Clevaland, C. W. Merriken, Vice-Pres, New York; John R. Thampson, Vice-Pres, Chicago, Wm. H. Schmidt, Jr., Vice-Pres, New York; John S. Vresland, Vice-Pres, New York; Robert G. Lewis, Vice-Pres, New York; Merwin H. Dick, Vice-President, Chicago; Arthur J. McGinnis, Exec. Vice-Pres, and Treasurer, New York; John Gayura, Jr., Asst. Treas., New York.

#### AMENTS READERS AAND DORS. wherein readers tell what they like-and don't like

#### PINPOINTING DIFFICULTIES ON THE ROAD

Since the introduction of the diesel locomotive, it has become generally known that these units are an unrelenting source of petty troubles. These troubles result from accumulated dirt, age, and other factors. Usually, when confronted with troubles on the road, a basic knowledge of the mechanical and electrical functions of the equipment are about all that are required in order to correct most of the difficulties without assistance from maintenance forces. This make it possible for trains to arrive at terminals without too much delay.

Often troubles are not corrected because there is misunderstanding of the function of a part. Such confusion can end in complete failure. This might be eliminated if each engineer and fireman could be sent to a school. Since this is not possible, the railroads feel they do the next best thingfurnishing each man manuals covering the locomotives they are required to operate, This, in itself, is a good idea, but unfortunately, not good enough.

Present day diesel manuals refer to the action and equipment of the locomotive as a brand new piece of motive power. No allowance is made for the condition of the locomotive after numerous overhaulings and with accumulations of age and dirt, Resetting and recalibrating of different parts sometimes results in operations not entirely covered by these manuals, adding to the problems encountered.

Assume a fireman is unable to cope with a condition of partial engine loading en route. Maintenance forces are alerted to the condition by a work report which states: "Engine not loading properly." The locomotive is checked and sequence tested; performs favorably, and may again be dispatched without correcting the trouble, Failure may occur only while under power -conditions altogether different from those at the diesel shop.

If the maintenance men know how the locomotive was acting, before and after the trouble, many valuable hours might be saved. A new aid to trouble shooting could be provided with a form to be filled in by fireman, and giving the information listed below;

- Train . . . Engine (No. of Units) . . .
- Tonnage . . . Milepost . . . Date . . .
- 3. Battery charging ammeter reading.
- Auxiliary generator voltage. Loadmeter reading in amperes
- 6. Throttle position (preferably Run 8)
- Reverser position.
- 8. Selector switch position.
- 9. Selector lever position.
- 10. Locomotive speed,
- II. Control air pressure.
- 12. Booster air pressure.
- 13. Lubricating oil pressure,

#### 14. Fuel oil pressure.

- 15. Cooling system water temperature.
- 16. Governor oil level.
- 17. Load control: Fuel limit, Stabilizing.
- 18. Engine fuel rack position, both sides.
- 19. Load regulator arm position, indicated with arrow, viz.
- 20. Cooling system water level.
- 21. Lubricating oil level.
- 22. Any other comments deemed neces-SELV.
- 23. Contactor and relay sequence,

Good . . . Bad . .

This should assist the mechanic and electrician in making positive repairs in the shortest possible time. If information such as this were taken under actual operating conditions at full power and on a ruling grade, it would be invaluable to maintenance forces in pinpointing difficulties encountered on the road,

> E. C. Towler, Locomotive Engineman, Southern Pacific Lines.

#### KEEPING GOOD MEN

#### A Difference of Percentages

On my vacation trip to the west coast I saw several good reasons why bright young college graduates do not remain with the

If the railroads have training courses for mechanical engineering graduates, the courses are given principally in the larger shops. On completion of the course, the man goes to the bottom of the totem pole of either management or mechanics roster. If he becomes an inspector or minor foreman, he may be, and is, shipped out to one of the outlying shops and, as I observed on my trip, that could be a "gosh awful" hole in the desert. A very few years' experience in such places, and maybe several places, and that man is on his way anywhere else.

Big industrial firms offer the graduates a position, no less, in such pseudo-glamourous places as New York, Los Angeles, Chicago, etc., and attach a promise of the "whole world with a little white fence arount it." Who wins?

Another point is the question of deductions for pensions. Railroads deduct 61/4% with a future promise of 6%%. Union leaders now have a bill before Congress to boost the deduction to 71/4%. Social Security is approximately 11/2%. Believe me, many prospective employees figure that difference, multiply the difference by 40 years, and come up with a big "No thanks."

All railroads point with pride to their long list of men and officers "who have been with us 50 years." To an aspiring young man who hopes to get some place without perspiring too much, that long list looks

like some expiring would help his aspiring. So he takes off for some company which does not promote by seniority.

> G. Charles Hoey, Mechanical engineer, Bessemer & Lake Erie

#### A Good Training Course Essential

. Five or six years ago a study made on this railroad showed that we were at the time losing a sizeable percentage of the college trained people who came to the railroad for employment. As might be expected, this operated as something of a screening device because we had some reason to suspect that the men leaving were, in fact, the more desirable members of the group.

However, we believe that this situation has changed materially during the past five years. During the past five years we have engaged in more extensive college recruiting than in prior years and have not experienced any great difficulty in attracting high caliber graduates to the company. In addition, we find an increasing number of high caliber people writing or calling us for employment.

I think that much of this can be attributed to the reputation for progressiveness which the C&O enjoys. Also, I think there is no doubt but what the railroad industry as a whole has benefited in recent years from the progressive attitude that has been exhibited by a number of carriers.

The extensive publicity that has been given to railroading by the activities of the New York Central, the Pennsylvania, the Baltimore & Ohio and many other railroads throughout the nation has undoubtedly created a much more favorable climate, as far as attracting young men is concerned, than existed just a few years ago. Young college trained men are particularly interested these days in the training and development facilities which a company offers. One of the first questions the college graduate frequently asks is "what kind of training programs do you offer?" As you are well aware, many of our railroads, themselves, are acutely interested in the subjects of training and management development and are taking constructive steps to develop improved programs. News of these activities is reaching many of the college graduates and is serving to stimulate their interest in railroading as a career. All of the major departments on the C&O have provided definite training opportunities for people with management potential and, although you are primarily interested in the situation regarding college trained men, it is well to point out that our training oppor-





New train is sleek...low...light. Jet Rocket highballs along Rock Island's tracks. Gleaming stainless steel body and strong USS T-1 alloy steel underframe both contain nickel and contribute to a safer and lighter, modern train.

#### Cars built with steels containing nickel

### The iron horse gets its second wind

It's here! The proven Talgo, backed by over 1,000,000 miles of service in Spain . . . it's Rock Island's "Jet Rocket." Built by American Car and Foundry Division of ACF Industries, its design promises to revolutionize American railroad passenger travel.

Nickel has a vital part in this. The modern Jet Rocket costs less to build, and its light weight, low center of gravity and speed mean it costs less to run and maintain.

The Jet Rocket, like most other new lightweight trains, is sheathed in gleaming stainless steel. For with nickel this alloy is strong, tough and corrosion resistant. Cars can carry more pay load per square foot and always look clean.

Nickel is also an essential alloying element in the high-strength USS T-1 steel used in the under-frames of the Jet Rocket. Every pound of alloy steel does a bigger job, because, pound for pound, such steels are stronger, more resistant to impact, and offer clear-cut weight savings.

Do you have a problem involving metals? Are corrosion, high temperatures, stresses, or fatigue causing trouble? Let's talk it over. We may be able to find out how nickel or a nickel alloy can overcome it.

Write for "List A" of available publications. It includes a simple form that makes it easy for you to outline your problem for study.

Nickel Alloys perform better, longer



THE INTERNATIONAL NICKEL COMPANY, INC. \$7. Well \$150.00



### reclaims them all

Reclamation of aluminum, steel and bronze diesel engine parts with Aircomatic is fast becoming standard practice in the railroad industry.

Aircomatic welding is an inert-gas, shielded arc process using a consumable wire electrode. The basic unit, manual or automatic, designed and manufactured by Airco, includes the welding head, carriage assembly for wire drive and control equipment, cables, hoses, and flexible wire casing.

Airco shielding gases include both helium and argon, produced by Airco, or mixtures thereof for particular requirements. Pure carbon dioxide gas is also available, from Airco for use as a shielding medium

where applicable.

The consumable wire electrode is produced to rigid Airco specifica-tions as to purity, cast, and metallurgical content. Normally supplied on expendable spools, Aircomatic wire is available in alumium, steel, stainless steel, nickel, titanium, copper, and copper base alloys.

Aircomatic is a direct-current welding process. A complete line of Airco motor-generator and rectifier type welders are designed for Aircomatic characteristics—the latest of which is a new constant potential 800 amp ACV welder.

Other Airco inert-gas welding processes include Aircospot and Heliwelding. Write today for details.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND



#### AIR REDUCTION SALES COMPANY

A division of Air Reduction Company, Incorporated, New York 17, H. Y.

In Cuba

principal cities

On the west coast -Air Reduction Pacific Company Internationally -

**Cuban Air Products Corporation** In Canada -Air Reduction Canada Limited Airco Company International

Products of the divisions of Air Reduction Company, Incorporated, Include: AIRCO — industrial gases, welding and cutting equipment, and acetylenic chemicals \* PURECO — carbon diaxide, liquid-solid ("DRY-ICE") \* OHIO — medical gases and haspital equipment \* NATIONAL CARBIDE — pipeline acetylene and calcium carbide \* COLTON — polyvinyl acetates, alcahols, and other synthetic resins.

#### A Good Training Course Essential

(Continued from page 4)

tunities are by no means limited to college graduates. We know that we have many people in the rank and file who possess high native intelligence even though they may not possess college degrees. We believe these people provide our most important pool of future management people and we are making every effort to refine and improve our methods of selection and of appraisal and development of people from this group.

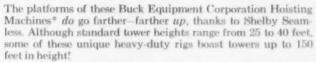
And now about incentives. May I say that I think the railroad industry as a whole has been entirely too timid in talking about the advantages, benefits and incentives which the industry as a whole affords. The result is that many of our benefits and incentives are taken for granted and, surprisingly enough, are frequently not understood by many railroad people themselves. I realize that you are thinking strictly in terms of incentives for management people, but I think that the advantages of railroad employment insofar as all railway people are concerned should be better known and understood by all railroaders. Insofar as incentives to encourage potential executives to stay with the company—the C&O provides some very liberal incentives. A number of these are, of course, restricted either in terms of years of service or level of position, but by the same token they provide substantial benefits that may accrue to an individual if he remains with the company and progresses. The latest feature to be added to our group of incentives is our group life insurance program which became effective June 1, 1956. This program provides life insurance equal to an individual's annual salary rate at no cost to the individual. The program is made available to our entire management group plus the majority of our professional and technical people.

To sum up-and in direct answer to some of your questions-I would say that the C&O is successful in recruiting the men we want to hire in face of competition of other industries. Speaking in terms of college graduates, I think perhaps the greatest problem a railroad or any other company faces in college recruiting is in establishing proper relationships and contacts right at the source—the colleges and universities. We feel we have gone a long way toward solving this problem by the simple expedient of confining our major recruiting efforts to a relatively small number of schools. In this way we have the opportunity to make ourselves and our organization better known and better understood both by the students and professors. Not infrequently a professor will call our attention to a man in his sophomore or junior year at college and suggest that we keep an eye on him as a potential employee. This is a very definite advantage and one that could not be had if we simply restricted our efforts to visiting a number of campuses in June-to talk with those graduates who are left over after other industries have taken their pick.

> Frank J. Householder, Jr., Chief of personnel services Chesapeake & Ohio

## How Shelby Seamless Tubing



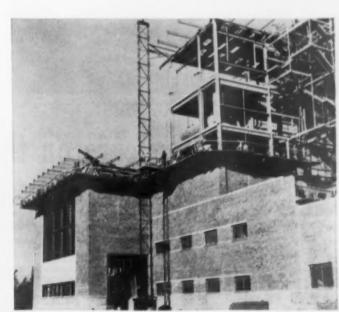


The slender tower of the Buck Portable Hoisting Machine is constructed of  $2\frac{3}{8}$ " OD x .120" wall, cold drawn sections of Shelby Seamless Mechanical Tubing, which afford both the structural support for the equipment and the track on which the platform moves. Self-erecting, the tower unfolds like a jack-knife-raises or lowers in 2 minutes, 11 seconds. Operating power is supplied by a 21 H. P. air-cooled engine.

Here is an application where the use of seamless tubing is virtually mandatory. What other material could supply the combination of high strength, light weight, and flexibility needed to make a completely portable hoist that would unlimber in minutes, then send a 2000-pound load of building bricks soaring up its vertical track at the rate of 140 feet per minute?

Shelby Seamless Tubing possesses the strength, uniformity and dimensional accuracy that make it ideal for structural applications such as this. Produced to exacting standards by the world's largest manufacturer of tubular steel products, Shelby Seamless is available in a wide range of diameters, wall thicknesses, various shapes and steel analyses. You are invited to consult our engineers at any time. They will make a study of your product requirements and will help you to apply Shelby Seamless to your specifications.

Manufacturer's name on request.



NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)



COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS - UNITED STATES STEEL EXPORT COMPANY, NEW YORK

SHELBY SEAMLESS MECHANICAL TUBING





# Expert at getting cars on the line ...and master of gin rummy

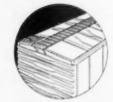
Meet Don Petersen.

He's Standard's Vice President in charge of operations. In his leisure hours Don takes on all comers at gin rummy, cribbage and golf—and in all three is a tough competitor.

On the job Don Petersen is the man behind the man who calls on you. He's an important part of Standard's tradition of service. He makes sure of the constant flow of Standard products -parts that come to you when and where you want them-as ordered.

Don's responsibility covers all of Standard's plant operations. Like all the Standard team, he is first and foremost a service man.

Whether your order is for one car or hundreds—for new car parts or replacement on existing equipment—you can depend on Standard to get cars on the road, paying their way.



Improved Dreadnaught Ends

Diagonal Panel Roofs

9 out of 10 house cars now in operation on America's railroads are equipped with Standard Ends and Roofs.



#### Standard RAILWAY EQUIPMENT MANUFACTURING COMPANY

General Office: 4527 Columbia Ave., Hammend, Ind. - New York - Chicage - St. Paul - San Francisco Standard Railway Equipment Manufacturing Company, (Canada) Ltd. Sun Life Building, Montreal



Diesel crankshaft inspection with a Magnagla RC-1925 unit at the NEW YORK CENTRAL Diesel Shep in Collinwood, Ohio.

## Diesels are Different-

to find cracks in precision parts, you need precision testing equipment designed for the job



Zyglo ZA-37 unit in use for rapid and reliable testing of Diesel valves during overhaul—to find any cracks from service.

Magnaglo DRC unit maximum sensitivity in inspection of pistons, rods, pins, gears, injectors, etc. Fast, low cost inspection for shops where any Diesel work is done.



MAGNAFLUX CORPORATION

7320 West Lawrence Avenue 
• Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15
Detroit 11 • Dallas 19 • Las Angeles 58



• With Diesels, you must inspect many more precision parts for cracks than you ever had with steam. For example, cracks are serious in pistons, piston carriers, rocker arms, injectors, connecting rods, crankshafts and others. In any of these parts, cracks may mean road failure, high-cost unscheduled repair, severe damage.

Magnaflux\* designs and builds the equipment used by most railroads to find all cracks in every working part in a Diesel. Fast, cheap-to-use, and nondestructive, this equipment meets the testing need in each kind of Diesel shop.

#### THE MAGNAGLO' RC-1925

For major Diesel shops, this unit provides fast low cost inspection of all working parts made of magnetic metal—no matter how big. Crankshafts, axles, and other major parts get quick, positive crack detection that cuts the time and cost of safe overhaul. Any small part is easily tested, too.

#### THE NEW ZYGLO" ZA-37

Makes certain that no cracked exhaust valves, aluminum pistons, or other nonmagnetic parts will get back into service because of "the crack that couldn't be found."

#### MAGNAGLO' DRC-543

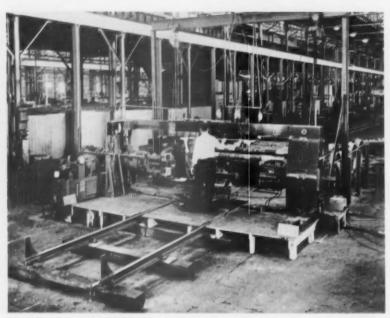
The ideal unit for "topping" inspection in turn-around shops where Diesels must be back on the road in the shortest possible time. Offers maximum sensitivity in fast inspection of pistons, heads, rods, pins, gears, injectors, etc.

Magnaglo and Zyglo units for railroads are built for railroads. Marking every crack with a glowing fluorescent line, they are the only equipment giving positive detection of crack-type defects, with least man hours. They are recommended by railroad authorities as the "standard" accepted test for crack-type defects.

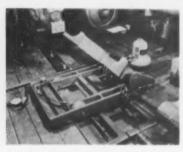
Write today for free interesting bulletins and technical reports telling how railroads are using Magnaflux' testing methods to increase the dependability and availability of their Diesels. No obligation, of course.

<sup>e</sup> Magnaflux, Magnagle and Zygle are registered trademarks of Magnaflux Corporation.

MAGNAFLUX



Baldwin 300-ton wheel press produces practically automatic production-line mounting of wheels.

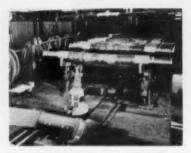


The pneumatically propelled carriage transports the wheel-axle assembly onto the axialtravel dolly at the press.

#### 300-Ton Wheel Press

Advantages claimed for this 300-ton wheel press are nearly automatic production-line wheel mounting; powered transportation of wheel assemblies into the press; positive power positioning of axle height at the press; only a shallow pit required for the press foundation; fast and simple changeover for pressing on roller bearings; and handling of Spicer drive axles and diesel geared wheels without readjustment.

The complete 21,000-lb machine consists of the press, a make-up stand positioned at the axle rack, a transfer carriage which transports the wheel assembly to the press, a dolly for moving the transfer carriage axially when pressing the second wheel, and the hydraulic power source. Combined, these are said to increase production and decrease labor requirements while safety is increased through elimination of hazard-



Make-up stand which has pneumatically operated transfer arms, serves as a trip at the

ous manual operations involving loose wheel assemblies.

Both assembly and pressing operations can be performed simultaneously with two operators. The pneumatically-operated transfer arms of the make-up stand serve as the trip at the end of the axle rack segregating the first oncoming axle so the wheels can be slipped over the journals. Under control of the make-up man, the pneumatically-powered transfer carriage runs on a track between the make-up station and the press. It then rolls onto a dolly so it can be moved sideways during the pressing operation. After the wheels are pressed, the carriage's speciallyarranged lifting arms lower the assembly to the runout track.

The cast steel hydraulic cylinder has lugs for holding tension bars and provides for a 24-in. stroke. The 13-in. dia cast iron ram is bored for double-acting jack

ram control and has an approach speed of 125-in. per min, a pressing speed of 17-in. per min, and a return speed of 200-in. per min. The resistance post is a welded steel assembly pinned to the rolled steel tension bars and fixed on the foundation. It is not necessary to move this post when pressing on roller bearings because ample space can be obtained by swinging away the hinged yokes attached to the post and pressing

Attachments and tools consist of pneumatically positioned pressing plugs which can be moved into place or removed quickly, pressing yokes with heat-treated steel extension ends, plug pressing extensions, and necessary parts for handling wheels from 28 to 50-in. dia, axles up to 7 x 14-in, and wheel assemblies with gears, Spicer drives and roller-bearing boxes,

The 10.6 gpm axial, piston type hydraulic pump develops a pressure of 4,150 psi and has a 20-hp motor. Press control is through a foot switch and pendant-mounted push buttons. Floor space required is 21 x 5-ft. Baldwin-Lima-Hamilton Corp., Dept. RLC, 545 N. Third street, Hamilton, Ohio.



#### Journal Lubricator

The Acme journal lubricator, thority for the installation of which in 10,000 cars moving in general interchange service has been granted by the AAR, is reclaimable. It consists of a combination of wool and cotton materials, each of which, according to the manufacturer, is highly oil-retentive and provides excellent capillarity. A multiplicity of woolcotton yarn loops are secured to both top and bottom faces of the pad with none extending beyond the vertical sides.

A 100% wool batt core furnishes maximum oil flow to the journal bearing, provides a ready reservoir of filtered oil, and assures required resiliency. A number of yarn stays through the entire pad give internal stability.

The lubricator is available in two sizes, "9-10" for 5-in. x 9-in. and 51/2 in. x 10 in. AAR standard journal boxes, and "11-12" for 6-in. x 11-in. and 61/2-in. x 12-in. standard boxes. The respective sizes are permanently identified on a marker located between the grommets which are used for removing the lubricator from the box. Journal Box Servicing Corporation, Dept. RLC, 332 South Michigan avenue, Chicago 4, 111.

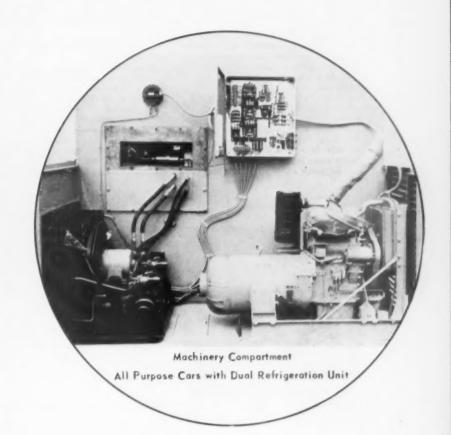
## **ONE THOUSAND STRONG!**



Yes, 1,000 STRONG is the pooled fleet of mechanical refrigerator cars operated by Fruit Growers Express Co., Western Fruit Express Co., and Burlington Refrigerator Express Co.—the result of more than 20 years' pioneering and research to provide shippers and consumers zero-safe low-cost rail transportation...

Control of the mechanical refrigeration system is completely automatic... These dependable and versatile mechanical refrigerator cars provide thermostatically controlled refrigeration or heating—from zero to 70° F... They are backed up by an experienced, fully equipped, coast-to-coast service organization to insure top-notch performance...

Since the first of these mechanical cars was placed in general service by our Companies on February 25, 1949, their pooled fleet of 1,000—with an average age of less than two years—has transported more than one million tons of commodities—or more than 31,000 carloads—and the fleet has traveled more than 56 million car miles under load!



Pioneers in Mechanical Refrigeration in Refrigerator Cars
FRUIT GROWERS EXPRESS COMPANY
WESTERN FRUIT EXPRESS COMPANY
BURLINGTON REFRIGERATOR EXPRESS COMPANY

### **EQUIPMENT**

#### . . NEW IDEAS . . NEW USES



Rolled-out position for servicing

#### Air-Conditioning Unit

The "roll-out" air-conditioning unit, for under-car installation, measures 55½ x 33½ x 25½ in., including the integral extension tracks. The diesel engine, directly connected to the air-conditioning compressor, is said to eliminate about 50 per cent of the electrical load required for the operation of conventional cooling.

Flexibility of the design permits its application on conventional cars, suburban or gallery cars, and partial or full-dome cars. Refrigeration capacity is 15 tons.

In the engine-compressor package is an engine-cooling system, fuel and lubricating oil filters, compressor controls, flexible refrigerant and fuel lines, and electrical cables. Internal wiring and piping is complete. Self-sealing couplings on refrigeration hoses and disconnect plugs and receptacles for electrical cables are standard.

The compressor is a Trane nominal 15ton, 6-cylinder reciprocating machine with

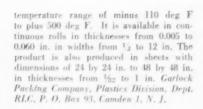


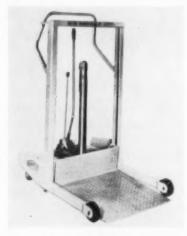
Under-car operating position

a 2½-in. bore and 2-in. stroke. It is equipped with unloaders to modulate capacity with cooling demand. Speed of the engine and compressor is adjustable from 1,200 to 1,800 rpm. A 10-ton compressor can be supplied.

The continental diesel engine, which uses No. 2 diesel fuel is designed to operate continuously during the period cooling is required. It is a 4-cylinder model which can be started from inside the car, or at the unit. A magnetically operated friction clutch engages the compressor upon demand from a thermostat.

Controls for this air-conditioning package include a refrigeration dual pressure safety switch, a diesel engine low-oil pressure and high-water temperature safety switch, compressor test switch, and engine-starting equipment. Controls are mounted on a control panel which also has compressor oil pressure, suction pressure and discharge pressure gages with shut-off valves. Trane Company, Dept. RLC, La Crosse, Wis.





#### Portable Hydraulic Lift

This 500-lb capacity hand-operated portable hydraulic lift for handling small loads, can also be used as a stacker or a work platform.

The device is equipped with a 24-in, by 24-in, platform that levels flush to the floor to slide under loads and has adequate lift height to reach benches, machine beds, etc. The manufacturer claims that it incorporates the convenience of a two-wheel shovel truck and stability of a four-wheel lift truck. It can be moved easily in crowded aisles, into over-the-road carriers or onto elevators.

Specifications of the unit include: 500 lb capacity at a 12 in. load center; minimum to maximum lifting height of 0.42-in.; turning radius of 50 in.; overall height of 54 in.; overall length of 34% in. and weight of 254 lb. The Oster Manufacturing Company, Dept. RLC, Box 4326, Cleveland.



#### Emergency Lighting Unit

The two 25-watt sealed-beam flood lamps of this lighting unit automatically switch on in the event of a power failure and off again when regular power is restored. The unit is wired into a standard 115-volt ac line and the five-cell B4H Edison nickeliton-alkaline battery is kept trickle charged.

When power fails, a relay switches on the lights which will burn for periods up to 8 hr. When power is restored, the battery automatically switches back to charge.

Recharging can be speeded up manually and will revert automatically to trickle charge when battery is fully charged. The enamelled case is 18 in long, 95% in. wide, and 20¼ in. high (over lamps). The weight complete is 82 lb. Edison Storage Battery Division, Thomas A. Edison, Inc., Dept. RLC, West Orange, N. I.

#### Cementable Teflon Tape

This cementable non-toxic, non-contaminating and chemically impervious. Teflon tape is available in thicknesses as low as 0.005 in. Heretofore, the tape has been limited to thickness of ½6 in. and up. According to the manufacturer, the thinner tape will expand use of Teflon as linings for conveyor guide rails, hoppers, and other work surfaces handling corrosive materials, etc.

With its anti-sticking surface characteristics, the tape possesses excellent dielectric properties and a broad service

#### Freight-Car Insulation

Microlite insulation is available in 120-inwidths for railway refrigerator and freight cars. Previously, it was produced only in widths up to 72 in Facing materials on the new widths include foil, reflective coated paper, and reinforced or unreinforced paper vapor barriers.

It is said that, when properly installed, (Continued on page 98)

## **AiResearch Turbochargers**









These
scientifically-engineered
turbochargers
for your mobile,
stationary or marine
diesel engines





available









AiResearch has incorporated into the design and manufacture of its turbochargers the greatest experience in the field of small turbomachinery of any company in the world! With these results:

AiResearch turbochargers increase power up to 100%. The only limitation is the design and application of your engine.

Because they are air-cooled, they place no extra burden on your cooling system. They cut fuel costs up to 20%, reduce noise and decrease or completely eliminate diesel smoking.

They're easier to maintain than any other turbochargers. A removable rotating assembly simplifies and reduces maintenance. They allow your diesels to operate at full efficiency from sea level to more than 8000 feet.

We invite your inquiry on how you can improve the performance of your diesels by the application of AiResearch turbochargers.

#### BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS

MODEL	7-10	7-14	T-15	1-30-5	T-30-6
Diameter - in. nom.	9	11.5	15.25	15.25	16
Length - in.	9	14.12	16.75	17.25	21.75
Weight — Ib.	40	95	125	135	195
Output - Ib/min. (Standard Conditions)	25-40	35-65	35-65	70-95	115-175

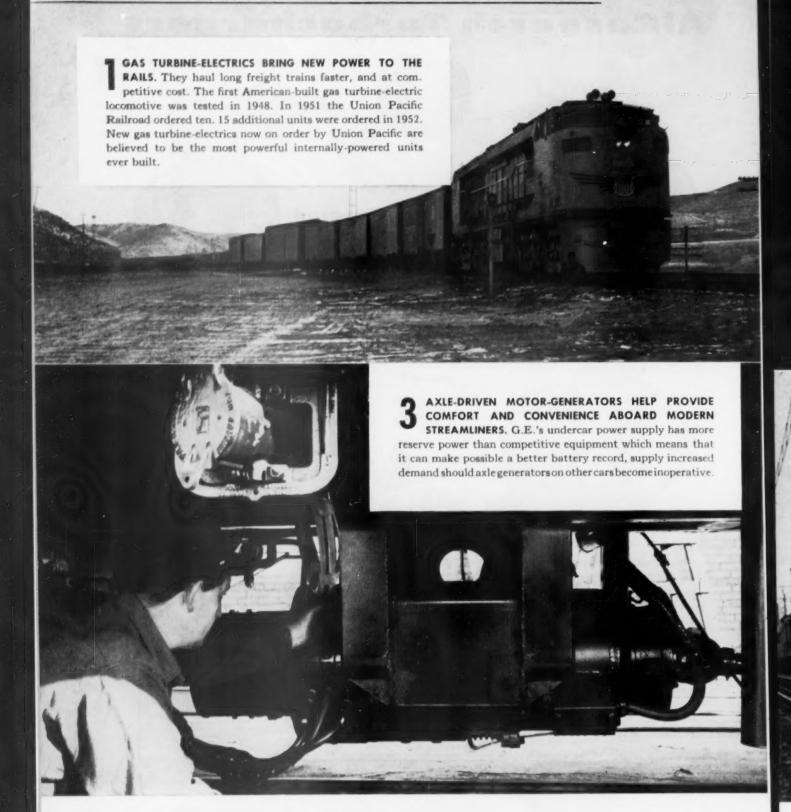


#### CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS



Four Examples of How General Railroad Progress with Electrical



Electric Promotes
Pioneering

For more information, contact your G-E Apparatus Sales representative, or write Section 135-7A, General Electric Company, Locomotive and Car Equipment Department, Erie, Pa.

Progress Is Our Most Important Product

GENERAL ( ELECTRIC



## NEWS..

#### Bad-Order Ratio at 91/2-Year Low

The ratio of bad-order freight cars to total ownership on Class I railroads fell to 3.9% as of July 1, the first time it had been under 4% since January 1947.

This was reported by Chairman A. H. Gass of the Car Service Division, Association of American Railroads, in his latest monthly review of the "National Transportation Situation". Mr. Gass also pointed out that the 3.9% ratio "marks achievement of the railroads' announced goal" of reducing the bad-order ratio to 4%.

The serviceable fleet of the Class I roads and their car-line affiliates totaled 1,711,941 cars on July 1, the CSD chairman noted. This was an increase of 4,452 cars above the June 1 total, and 19,107 cars above the total for July 1, 1955,

Mr. Gass' data on freight car performance indicated average output of 1,037 net ton-miles per serviceable car per day in April. That compared with a March average of 1,027 net ton-miles, and with an April 1955 average of 971 net ton-miles.

#### **Etching Diesel Parts** Saves Over \$14,000

Etching the month and year on diesel materials to maintain a record of application for warranty claims has saved one railroad over \$14,000 in three years, according to a recent report of the diesel parts committee of the AAR Purchases Stores Division. The materials on which this savings was made varied in value from \$25 to \$300.

The committee also urged extension of the practice of etching the application date to materials of smaller values. Saving could be made in clerical work by eliminating eard records, which would then have to be kept only on larger component parts.

The committee thought that improved design and increased life of diesel parts might result from the greater use of etching as this type marking would facilitate inspection in scrap piles for cataloging of defects.

#### Miscellaneous **Publication**

Forged Railway Axles. American Iron and Steel Institute, 150 East 42nd street, New York 17. This is a revision of Former Section 22 of the AISI Steel Products Manual on Forged Axles and Locomotive Forgings. Part I of the revision describes forged axles used principally for locomotives and cars for railroads, electric railways and industrial railway equiment; Part II, manufacturing practices; Part III, AAR standard axles and alternate standard axles, and Part IV, standard specifications for carbon steel and alloy steel forging for railway use and tentative specification for untreated carbon steel axles for export and for general industrial use.

#### ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE AUGUST ISSUE

DIESE		TRIC LOCOMO				
Road and builder Kansas, Oklahoma & Guer:	unita			Other detail		
Electro-Motive	2	1,750 General	purpose	Approximate cost, \$350,000. For June 1957 delivery,		
	FRE	IGHT-CAR OR	DERS			
Road and builder	No. of	Type of our	Cap.,	Other detail		
CENTRAL OF GEORGIA:	curs	rypu oy cur	TOTAL	CHART INVALIA		
Greenville Steel Car	5	Drop-end gon- dolas	70	Base price \$9,400 each. Fourth quarter delivery.		
CHICAGO & NORTH WESTERN: Pullmon-Standard	15	Box.	50	In addition to previous order.		
CHICAGO, ROCK ISLAND & PACIFIC: Pullman-Standard	300	Hopper	70	In addition to assuring and a De-		
	300	110hhay	719	In addition to previous order, De- livery anticipated next year.		
COLUMBUS & GREENVILLE: Pullmon-Standard	100	Box	50	Approximate unit cost \$7,000. De- livery fourth quarter 1957.		
ERIR: Greenville Steel Car	300	Gondola	70	Estimated cost \$2,500,000. Deliv-		
FLORIDA EAST COAST:				ery to start next May.		
Magor Car	100	Gondola	70	In addition to previous order. Approximate cost \$715,000. De- liveries anticipated before end of year.		
Genesee & Wyoming: International Ry. Car	1	Caboone	4000	Estimated cost \$13,960. Delivery expected last quarter 1956.		
GREAT NORTHERN:				the state of the s		
Beldwin-Lima-Hamilton	25	Air dump	_	***)**(****		
Pullman-Standard	200	Cov. hopper	70	Estimated cost \$1,649,000. Second quarter 1957 delivery.		
NORFOLK & WESTERN: Pullman-Standard	25	Box	50			
PITTSBURGH & WEST VIRGINIA:		1307	30	******		
Pullman-Standard	100	Gondola 70		Replaces previous order for 50-to- hox cars placed with same builde late last year.		
VIRGINIAN	N		70	Materials ordered. Work scheduled to begin about May 15, 1957.		
		ENGER CAR O	RDERS			
Road and builder		o. of	nd eac	Other detail		
CANADIAN NATIONAL:	cars Type of car			toner detail		
Canadian Car & Fdry		5 Dinette		Approximate cost \$1,090,000. For October 1957 delivery.		

INQUIRIES AND NOTES FREIGHT CARE:

Hanger & Aroslook.—Directors have authorized purchase of 500 box cars "to protect the company's paper traffic."

#### Personal Mention

(All operating functions of this government-owned road combined in one department under reorganization plan approved by Department of the Interior.)

R. H. BRUCE appointed general superintendent of operations in charge of communications, engineering, transportation and motive power and equipment. These departments designated "branches" of the new operations division. GERALD V. RAN-DALL continues as superintendent of motive power and equipment.

#### Canadian National

D. A. FOSTER, general machine shop foreman at Winnipeg, appointed mechanical engineer, Atlantic region. Headquarters, Moncton, N.B. Allandale, Ont.

- W. W. RIDDELL, locomotive foreman re-
- L. A. METCALF appointed locomotive
- P. J. Goden, diesel road foreman of
- engines, appointed road foreman of engines. F. M. McCuaig, locomotive foreman, Armstrong, Ont., appointed locomotive foreman, Nakina, Ont,
- I. E. LECUYER, assistant locomotive foreman, appointed locomotive foreman, Armstrong, Ont.
- E. E. ERICKSON, diesel road foreman of engines, appointed road foreman of engines, Capreol, Ont.

#### Chesapeake & Ohio

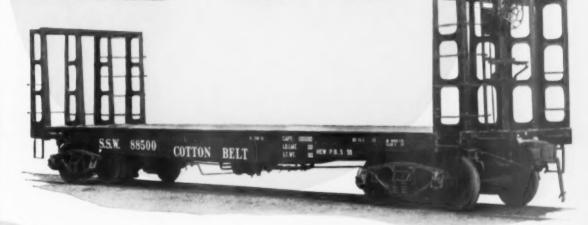
Russell, Ky.

V. H. Hit.Tz appointed motive-power inspector.



50-ton, 53'6" Flat Car with One-Piece Underframe.

# INSURE YOUR INVESTMENT in Modern Freight Cars



with Commonwealth

Commonwealth

Commonwealth Cast Steel Underframe and interlocking cast steel end posts.

One-Piece Cast Steel Underframes

Flat cars, pulpwood cars, ore cars and many other types of quality freight cars with Commonwealth Underframes assure superior, better-built equipment providing such advantages as:

- Greater Strength with Less Weight
- Longer Service Life
- Lowest Maintenance Costs
- Greater Availability
- More Revenue Per Car

... and Commonwealth One-Piece Cast Steel Underframes are available in all standard sizes.

Plan wisely for the future and insure your investment—equip your quality freight cars with cast steel underframes.



**GENERAL STEEL CASTINGS** 

GRANITE CITY, ILL.

EDDYSTONE, PA.

50-ton, 22 cord capacity Pulpwood Car with

#### PERSONAL MENTION

#### C&O (Continued from page 16)

ADAM MARTIN appointed motive-power inspector.

#### Huntington, W. Va.

H. R. Bays appointed car lubrication inspector.

#### Elgin, Joliet & Eastern

VIICH. R. HISTON, supervising car foreman at South Chicago, III., appointed airbrake foreman at Joliet.

MERLE C. WILLS, temporary carman at Joliet, appointed car foreman at South Chicago, III.

Wilbur J. SNELL appointed roundhouse foreman at Whiting, Ind.

#### Kirk Yard

ROBERT K. WILDER roundhouse foreman at Whiting, Ind., appointed general fore-

ALFRED H. GOVERT appointed assistant diesel supervisor and shop foreman.

RALPH J. JONES appointed roundhouse foreman.

MICHAEL A. MITERKO appointed relief roundhouse foreman.

#### Litchfield & Madison

WILBUR NOLL appointed general foreman at Edwardsville, III.

#### Louisville & Nashville Louisville, Ky.

JOHN F. RYAN, superintendent machinery, appointed chief mechanical officer, Former title abolished.

C. N. Wiccins, assistant superintendent machinery, appointed assistant chief mechanical officer-equipment. Former title abolished.

C. A. Love, assistant superintendent machinery, appointed assistant chief mechanical officer - motive power. Former title abolished.

J. W. Adams, general master mechanic, appointed manager of planning produc-tion. Former title abolished,

J. R. Douglass, assistant to superintendent machinery, appointed superintendent of equipment. Former title abolished.

S. C. Snow, general supervisor (diesel) at South Louisville, appointed superintendent of motive power. Former title abolished.

R. J. May appointed assistant manager of planning-production.

R. F. STUCKER appointed manager of

scheduling.
I. M. VAWTER appointed engineer of planning.

(Continued on page 92)

#### SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)

	Month of May			s ended May
Item No.	1956	1955	1956	1955
3 Road locomotive miles (000) (M-211):				
3-05 Total, steam	3.881	5.472	20.540	24.837
3-96 Total, Dienel electric	38,750	35.985	186,905	171,624
3-07 Total, electric	772	788	3,669	3,606
3-04 Total, locomotive-miles 4 Car-miles (000,000) (M-211)	43,650	42,472	212,260	201,108
t Car-miles (000,000) (M-211): 4-03 Loaded, total		v 201		
1 06 Empty, total	1.744	1,734	8,463	8.003
Empty, total     Gross ton-miles-cars, contents and cabooses (000,000)	3436)	3.21	4,689	4,472
(M-211):				
6-01 Total in coal-burning steam locomotive trains	10.510	13.666	51.666	57,735
6 02 Total in oil burning steam locomotive trains	674	1.874	4.649	7,116
6-03 Total in Diesel-electric locomotive trains	112,578	104.053	535,751	483,914
6-01 Total in electric locomotive trains.	2,435	2.168	11,153	11.012
6-06 Total in all trains.  10 Averages per train-mile (excluding light trains) (M-211)	127,125	122,643	607,350	563,309
10 01 Locomotive-miles (principal and helper)	1.03	1.03	1.03	1 00
10-01 Locomotive-miles (principal and helper) 10-02 Loaded freight car-miles	42.9	13.9	42.8	1.02
10-03 Empty freight car-miles	24.3	23 8	23 7	23.8
10-04 Total freight car-miles (excluding caboone)	67.2	67.7	66.5	66 5
10-05 Gross ton-miles (excluding locomotive and tender)	3.129	3,107	3.074	3.091
10 06 Net ton-miles	1.643	1.417	I.108	
12 Net ton-miles per loaded car-mile (M-211)	33.6	32 3	32 9	31.6
13 Car-mile ratios (M-211):				
13-03 Per cent loaded of total freight cur-miles  14 Averages per train hour (M-211):	63.9	61.9	64.3	64 2
	10.0		V 00 - 0	
14-01 Train miles 14-02 Gross ton-miles (excluding locomotive and tender)	18.6	18 8	18 7	18 9
14 Car miles per freight car day (M-240)	57,419	57,673	56,815	56,234
14-01 Serviceable	47.9	47.8	47.1	45.7
14-02 All	46 I	45 0	45 3	12.9
15 Average net ton-miles per freight cur-day (M-240)	991	943	957	869
17 Per cent of home cars of total freight cars on the line	41.0	45 5	41 -	10. 1
(M-240)	41.8	45.7	41.7	19 1
Passenger Service (Data from	LCC, M.	243)		
3 Road motive power miles (000):				
3-05 Steam 3-06 Diesel-electric	715	1.429	1,076	6.938
3-97 Electric	20,315	20,232	101,372	100,794
3-06 Diesel-electric 3-07 Electric 3-04 Total 4 Passenger-train car-miles (000)	1,239	1,294	6,105	6.658
4 Passenger train our miles (000)	00,009	22,956	111,852	114,392
4 08 Total in all locomotive-propelled trains	226.072	232.103	1.144.403	1 155 108
4 09 Total in coal-burning steam locomotive trains	1,181	7 984	24,792	39.913
4-10 Total in oil-burning steam locomotive trains	1.096	1.609	8,098	17,996
4 II Total in Diesel-electric locomotive trains	205,648	205,074	1,035,029	1,020,621
12 Total car miles per train-mile	9.72	9.71	9.81	9.71
YARD SERVICE (DATA FROM I	C.C. M-213	2)		
1 Freight yard switching locomotive hours				
1-01 Steam, coal-burning	258.136	205 502	1,255,664	1 294 217
1-02 Steam, oil-burning	33.206	43.285	144 169	207.703
1-02 Steam, oil-burning 1-03 Diesel-electric <sup>1</sup> 1-06 Total	3,929,266	3,670,354	19,293,019	17,562,742
I-06 Total	4,224,060	1,015,662	20,709,134	19,098,165
a frameiger yard novicing mours:				
2-01 Steam, coal-burning 2-02 Steam, oil-burning	5,420	8,175		
2-02 Steam, oil-burning 2-03 Diesel electric	3,268	5,428	15,129	24,750
2-03 Diesel electric <sup>1</sup> 2-06 Total	251,481	244,393	1,241,175	1,216,373
3 Hours per yard locomotive-day:	285 198	283,996	1,416,773	1,416,147
3-01 Steam	6.4	5.7	6.1	5.6
3-02 Diesel-electric	16.1	15.4	16 0	
3-05 Serviceable	16.0	15.2		
3-05 Serviceable 3-06 All locomotives (serviceable, unserviceable and				
atored)	14.6	13.5	14.4	13.1
1 Yard and train-switching locomotive-miles per 100				

All locomotives (serviceshle, unserviceshle and stored)
Yard and train-switching locomotive-miles per 100 louded freight cur-miles locomotive-miles per 100 passenger train cur-miles (with locomotives). Excludes B and trailing A units.

#### SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (thousands)	No. of car termina	Miles		
		System	Foreign	Total	set off
May, 1952	2,918,508	6.020	10.938	16.958	172.102
May, 1953	3,013,611	5.892	11,433	17,325	173.945
1954					
May	2,713,511	4,416	6.510	10.926	248,353
June	2,662,375	6.597	9.617	16,214	164.202
July	2,678,234	7.956	10.912	18.868	141.946
August	2.696.135	7,568	9.742	17.310	155,756
September	2,614,432	6.740	8.882	15.622	167.355
October	2,852,825	5,182	6.985	12,167	234.472
November	2,717,219	2,515	3.467	5.982	454.232
December	.2,751,644	1,501	2.294	3,795	725.070
1955					
January	2,714,070	1.813	2.701	4.514	601.256
February	2.517.483	2.266	3.970	6.236	403.701
March	2,830,398	2.717	5.976	7,793	363,197
April	2,787,705	3,471	6.485	9.956	280.002
May	2,931,850	4.860	8.664	13.524	216.788
June	2.945.955	6.080	10,226	16.306	180.666
July	2,906,558	8.086	13,635	21.721	133.813
Asagrant		8,355	14,358	22.913	128.941
September		5,896	10.469	16,365	178.649
October		3,966	7,182	11,148	271,364
November	2.950.228	2,010	3,972	5.982	493 184
December	2 , 922 , 034	1,819	3,774	5,593	522,444
1956					
January	2,925,109	2.029	4.302	6.331	462,029
February.	2 . 794 . 161	2,570	5.611	8.181	341.542
March	3,027,684	2,517	6,212	8.729	346,853
April	2.930.389	3,202	6,881	10.083	290,626
May	3 . 063 . 427	4.672	10,903	15,575	196.688

1.68

.78

1 60

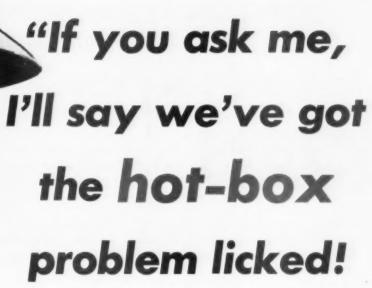
.76

1.69

.76

1 65

76



"Sure, we're always going to have hot-boxes. Worn brasses, broken collars, defective journals are the things you can't avoid-but let me tell you this: We have mighty few hotboxes any more due to lubrication failure, even though we repack journals every 36 months."

WASTE CONTAINER AND RETAINER

#### WAUGH EQUIPMENT COMPANY

New York, Chicago, St. Louis. Canadian Waugh Equipment Company, Ltd., Montreal





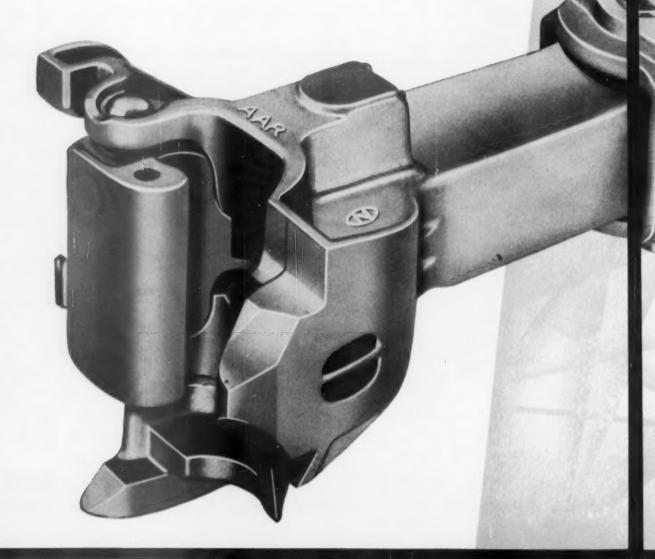
THE REASON 36 month repack

with Plypak permitted on request to the A.A.R.

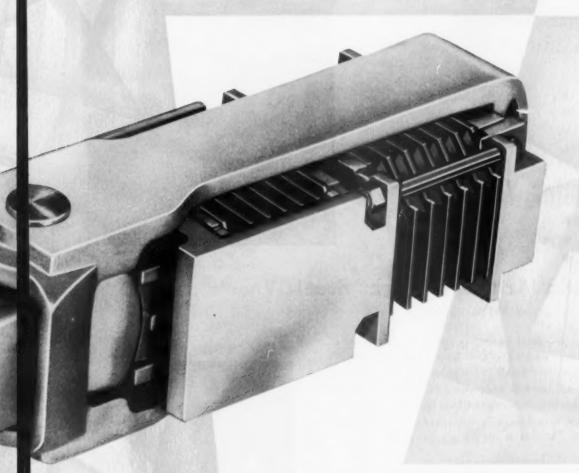
## There's Improved Railroading with National Specialties

REASON:

National's MF-400 Rubber-Cushioned Draft Gears have a rated capacity of 42,500 foot pounds, plus a reserve capacity 54 per cent greater than the rated — 65,500 foot-pounds! This reserve capacity guarantees the original rated capacity at the original force level over a longer period of time than possible with gears that have definite solid points at their rated travel.









AA-0504

#### NATIONAL'S 1Q SLIDE GRAPH

(Available upon request)

Shows total work done in foot-pounds during impacts between various cars at various speeds! Shows how much of this work National Draft Gears account for at various force levels! Points up need for high capacity in draft gears!

#### NATIONAL MARKET CASTINGS COMPANY

Established 1868

Cleveland 6, Ohio

COUPLERS
YOKES
DRAFT GEARS
FREIGHT TRUCKS
SNUBBER PACKAGES
JOURNAL BOXES





•



#### ... see why Armco Wrought Steel Wheels pay off

Special wheel steel, toughened by forging and rolling, packs extra service miles into every Armco One-Wear Wheel. That's why they're economical—give you more service in return for your wheel dollars.

Prove it to yourself, Just look under your cars. The date stamped on the back of the rim of each Armco One-Wear Wrought Steel Wheel tells you when it was made. Inspection of the tread contour will show its resistance to wear. Most likely you'll find plenty of service metal left in spite of its years on the rails.

More difficult to measure, but just as important, are these day-to-day advantages you get from Armco One-Wear Wrought Steel Wheels: Faster freight schedules to satisfy shippers, greater safety, and no maintenance.

Just call the nearest Armco Sales Office, or write us, for full information about long-lasting Armco Wrought Steel Wheels.





#### ARMCO STEEL CORPORATION

2116 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION . ARMCO DRAINAGE & METAL PRODUCTS, INC. . THE ARMCO INTERNATIONAL CORPORATION

## THE LUBRICATOR DESIGNED TO SOLVE SEVEN PROBLEMS



 AAR Approved for application to 10,000 cars moving in general interchange service.



NOTE • heavy loop pile surfaces • designed for easy application and removal • special unsized duck



NOTE \* 100% wool-batt core \* quilted construction to assure stability \* available in two sizes: 9-10 for 9" and 10" AAR standard journal boxes and 11-12 for 11" and 12" standard boxes.

# THE JBS ACME IS A POSITIVE ADVANCE IN JOURNAL LUBRICATION

The JBS ACME Journal Lubricator:

- is HIGHLY RESILIENT. It contains an ALL-WOOL quilted core, compressed to one-fourth its original size, to assure CONSTANT JOURNAL CONTACT.
- CANNOT POSSIBLY GLAZE!
- IS UNAFFECTED BY TEMPERATURE CHANGES.
- Has EXCEPTIONAL WICKING and FILTERING qualities.
- Contains an UNUSUALLY LARGE OIL RESERVOIR.
- IS RECLAIMABLE!
- Our original concept in designing the JBS ACME Journal Lubricator was to combine these six basic requirements of a good lubricator into one . . . yet provide a seventh essential —LOWER COST!

JOURNAL BOX SERVICING CORP.
Sales Office: 332 S. Michigan Ave., Chicago 4, III.

General Office: 1112 E. Kessler Blvd., Indianapolis 20, Ind.

## Here's why AIR-MAZE oil bath air filters were chosen for Train-Xplorer



Air-Maze oil both filter on auxiliary diesel engine of Train-Xplorer

Baldwin-Lima-Hamilton packed many innovations into the new type locomotive they built for New York Central's Train-Xplorer. Advanced, lightweight design, for one. Maybach diesel engines with hydraulic transmission, for another. Naturally, they insisted on the most advanced type of engine air filtration, too. They chose Air-Maze oil bath filters!

Why? Because from their experience with the many outstanding locomotives they've built, Baldwin-Lima-Hamilton knew that Air-Maze oil bath filters were the most effective in cutting engine wear, servicing costs and turbo-charger maintenance.

Independent laboratory tests prove that Air-Maze oil bath filters are the most efficient engine air filters used today. These tests show that the oil bath filter stops 59% more fine Arizona road dust than the next best filtering device. Furthermore, they maintain at least 95% efficiency even at lowest locomotive engine speeds and generally cost no more than competitive types of filters.

The same advantages that Air-Maze oil bath filters are giving Train-Xplorer are also rewarding dozens of other major railroads throughout the nation. If you are interested in additional facts or case histories showing how Air-Maze oil bath filters are prolonging the life of power assemblies and cutting costs, just write Air-Maze Corporation,



The biggest names in diesels are protected by Air-Maze filters



LUBE OIL FILTERS PASSENGER CAR FILTERS

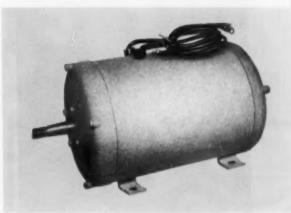
The Filter Engineers

# SPECIFY Safety'S NEW 1.5KW...14 Volt CABOOSE GENERATOR

... with these special features ...

- two phase AC generator
- no brushes
- no commutator
- no slip rings
- extremely wide speed range

FOR THE MOST
DEPENDABLE
CABOOSE
COMMUNICATION
and ELECTRICAL
REQUIREMENTS

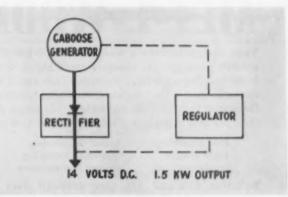


Operating characteristics of the new 1.5KW, 14 volt Caboose Generator are as follows:

- cut-in speed 700 RPM
- minimum full-load speed 1500 RPM
- maximum speed ...... 7000 RPM
- © ratio 10:1

Full output of the generator can be obtained at extremely low car speeds with any of the following drives:

- "Spicer" end-of-axle drive
- "Safety" V-belt drive
- "Safety" flat belt drive
- "Hydraulic" type drive



The complete "Safety" Caboose Generator Line includes equipment in capacities from 1.5KW to 5KW . . . 14 and 40 volts. A complete line of heavy duty lighting fixtures for Caboose applications is also available.

#### SAFETY INDUSTRIES, INC.

FORMERLY THE SAFETY CAR HEATING & LIGHTING COMPANY, INC

NEW YORK - CHICAGO - PHILADELPHIA - RICHMOND - ST. LOUIS - SAN FRANCISCO - NEW HAVEN - MONTREAL

SAFETY COMPANY PRODUCTS INCLUDE: Air-conditioning Equipment @ Genemotors @ Generators @ Fans @ Regulators @ Blower Units
Lighting Fixtures @ Switchboards @ Luggage Racks @ Motor Alternators @ Dynamotors @ Motor Generators @ Dual Voltage MG Sets



#### For MODERN PASSENGER CARS:



Original Beauty

in Panels
Partitions
Wainscoating
Doors

of

## ME<del>T-L-WO</del>OD

Your designers have a wide choice of beautiful modern passenger car interiors when Met-L-Wood is the building material... Smooth, tough panels and doors, finished in steel, stainless, aluminum, Formica or Decorative Vinyls permit original beauty of design, plus these practical operating advantages of Met-L-Wood:

Fast Assembly Light Weight Insulating Sound Deadening Vibration Damping Lowest Maintenance

Bulletins 520 and 521 give detailed data on Met-L-Wood doors and panels for passenger car interiors. Write for your free copies today.



MET-L-WOOD

CORPORATION

6755 W. 65TH ST . CHICAGO 38, ILL

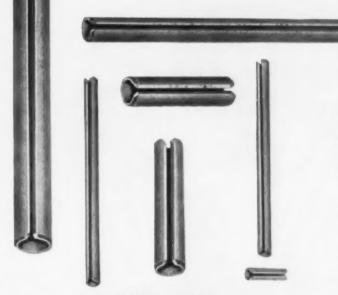




PLASTIC - FACED MET-L-WOOD

Met-L-Wood is the exclusive distributor of Formica products in the transportation industry. Now, you can use the many distinctive Formica designs — and excellent wearing qualities — bonded to Met-L-Wood panels and doors for unsurpossed beauty and utility in passenger car interiors. Full details on Formica-faced Met-L-Wood will be sent promptly on request . . and don't forget Formica superiority for table, counter and washstand tops!

# what makes this fastener DIFFERENT?



Several things. Rollpin® is a slotted, chamfered, cylindrical spring pin which drives easily into a hole drilled to normal production standards. It locks securely in place, yet can be drifted out and reused whenever necessary. This eliminates special machining, tapping, and the need for hole reaming or precision tolerances. Rollpin replaces taper pins, straight pins and set screws; for many applications it will serve as a rivet, dowel, hinge pin, cotter pin or stop pin.

And here's another difference that makes Rollpin the quality fastener in the field: ESNA's quality control builds consistent strength and performance into every Rollpin. Rollpin is uniform as to shear strength, dimensions, hardness, and insertion and removal forces.

HOW YOU INSERT IT



Orives easily by hammer, arbor press, or air cylinder and can be readily adapted to an automatic hopper feed. Requires only a standard hole, drilled to normal production-line tol-



Locks securely in place without using a secondary locking device; wan't loosen despite impact loading, stress reversals, or severe vibration.



Removes readily with a drift pin without damage to pin or hale, can be used again and again in original hale.

#### **HOW YOU SAVE**

You pay less for Rollpins than for most tapered, notched, grooved or dowel pins. Installation costs are substantially less than for any fastener requiring a precision fit or secondary locking operations.

Because of their tubular shape, Rollpins are lighter than solid pins. Production maintenance is reduced with Rollpins: they do not loosen and because of their spring action they tend to conform to the drilled hole in which they're inserted, without material hole wear, eliminating the necessity of re-drilling or using oversize pins.

#### MATERIALS AND SIZES

Standard Rollpins are made from carbon steel and Type 420 corrosion resistant steel. They're also available in beryllium copper for applications requiring exceptional resistance to corrosive attack, good electrical, anti-magnetic, and non-sparking properties. Stock sizes range from .062" to .500" in carbon and stainless steels.



## ESNÀ

## ELASTIC STOP NUT CORPORATION OF AMERICA

Dept. R40-923, 2330 Youghall Road, Union, New Jersey

- Rollpin Bulletin Elastic Stop nut Bulletin
- Here is a drawing of our product.
  What self-locking fastener would
  you suggest?

Name

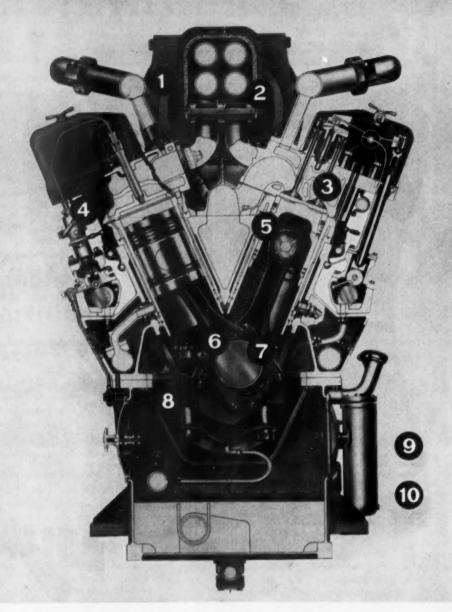
you suggest?

Firm\_\_\_\_\_

Zone State

SEPTEMBER, 1956 . RAILWAY LOCOMOTIVES AND CARS

## **NEW PERFORMANCE WITH**





Here are a few ALCO modernizations — most are available in kit form for application to the ALCO 244. Items which are normally accomplished by Factory Rebuild Service are starred.

- AtCO water-cooled turbocharger more efficient, responds rapidly to changes in speed and load, easy to maintain.
- Ni-Resist exhaust manifold reduces casting growth and failures.
- Cylinder heads strengthened with additional metal to distribute stress more uniformly, makes possible use of valveseat inserts.
- High-pressure fuel injection with anubber velve—more complete fuel combustion, lube-oil condition improved, line erosion reduced.
- Ni-Resist insert pistons top ring-groove wear reduced, increases ring mileage.
  - Grooveless and partially grooved engine bearings - oil-film thickness and loadcarrying capacity increased.
- \*Hardened, chrome-plated crankshaft.
- Serrated cylinder block -eliminates fretting at joint surface of saddle and cap, prevents distortion and misalignment.
- Oil-buth filter-maintains high efficiency over 94 per cent, reduced filter maintenance, reduces engine wear.
- Simplified amplidyne control system—fewer parts in system with simpler circuits, maintenance reduced.

# MODERNIZATION PARTS AND FACTORY REBUILD

#### Long-service ALCO locomotives can be modernized in railroad's shops or at ALCO's plant

Design improvements in ALCO 244 diesel engines, and locomotive chassis and equipment can add new efficiency in performance and help lower maintenance costs on long-service ALCO locomotives. These improvements are available to railroads in two ways:

Modernization parts are furnished in kits with complete instructions for application. Work is accomplished in railroad's own shops. Modernization kits are readily available from ALCO's regional warehouses.

Factory Rebuild Service applies modernization parts to 244 engines in ALCO's plant, also accomplishes chassis and equipment improvement. ALCO's extensive investment in machinery and rebuild methods permits operations such as saddle serration, crankshaft chromeplating, at moderate cost, and returns a completely remanufactured engine to the railroad.

Complete information is available at ALCO's sales offices. Or, if you wish, write P. O. Box 1065, Schenectady 1, New York.



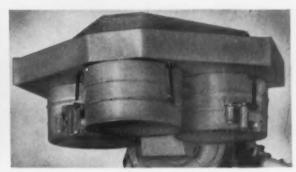
ALCO PRODUCTS, INC.

NEW YORK

Sales Offices in Principal Cities



Long-service locometives are rebuilt in ALCO plant. Railroads choose complete Factory Rebuild Service for upgrading locomotives. Work includes all engine rebuild and modernization, as well as chassis rebuild and improvements. ALCO returns locomotives up to present specifications for service.



Many reilroads have applied ALCO modernization parts to older units during regular overhaul achedules. The results have demonstrated better performance, improved efficiency and lower operating coats. Kits such as oil-bath filter modernization are readily available.

Te's Ella.

SINCLAIR LITHIUM

## ROLLER BEARING

New — but already proven by hundreds of thousands of miles of service to be outstanding for car and locomotive roller bearing lubrication.

Sinclair Lithium "RB" Grease is a uniform smooth grease having superior mechanical stability.

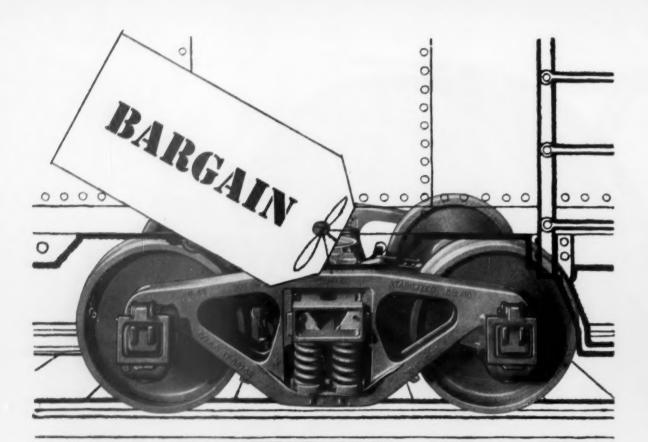
Sinclair Lithium "RB" Grease has excellent resistance to oxidation and is non-corrosive to bronze and other bearing materials.

Sturdy Sinclair Lithium "RB" Grease flows readily at low operating temperatures yet will not thin out at high operating temperatures or under heavy loads.

#### SINCLAIR RAILROAD LUBRICANTS

Sinclair Refining Company, Railway Sales, New York • Chicago • St. Louis • Houston





## COSTS SO LITTLE ... GIVES SO MUCH PROTECTION



Today Barber Stabilized Trucks are a greater bargain than ever because their savings are greater! Higher speeds mean more chances for costly damage to ladings and equipment.

Barber Stabilized Trucks provide a safe, dependable system of suspension and protection. Actuating springs, friction shoes and wear plates work together as vertical dampers and truck resquaring devices. Bumps and bounces are cushioned and compensated, nosing and violent swivelling prevented. Thousands of damage claims are *completely eliminated*; your equipment is protected; rail pounding and track maintenance are reduced.

We firmly believe that *nothing* you specify does so *much* for your railroad yet costs so *little* as Barber Stabilized Trucks! Standard Car Truck Co., 332 S. Michigan Avenue, Chicago 4, Ill. *In Canada:* Consolidated Equipment Company, Ltd., Dominion Square Building, Montreal 2.

Specify Smoother-Riding

## BARBER STABILIZED TRUCKS

STRONGER SILLS FOR WIDER DOORS

#### **Threshold Plates**

are permanently welded structural members of the car . . . they provide more rigid openings - more necessary than ever with wider doors! Floor boards don't pass under the 'M-F' Threshold Plate - worn or broken floor boards are more easily and more quickly replaced......

MAC LEAN-FOGG

Lock Nut Company
5535 North Wolcott Ave., Chicago 40, Illinois

In Canada: The Holden Co., Ltd., Montreal







AND with the 'M-f' Thresheld Plate uniform length floor boards may be used throughout the car.



Buy Griffin EQS

## FOR LONGER FLANGE AND TREAD WEAR!

The Griffin grain structure on tread and flange is at right angles to the rail—giving you a longer-lasting wheel.

Because of advanced casting methods . . . pressure pouring in machined graphite molds . . . the roundness of the Griffin EQS is practically perfect as cast. Absolutely no tread machining is necessary. The toughest metal *stays* where it reduces your costs . . . at the point of contact with the rail!



## GRIFFIN EQS

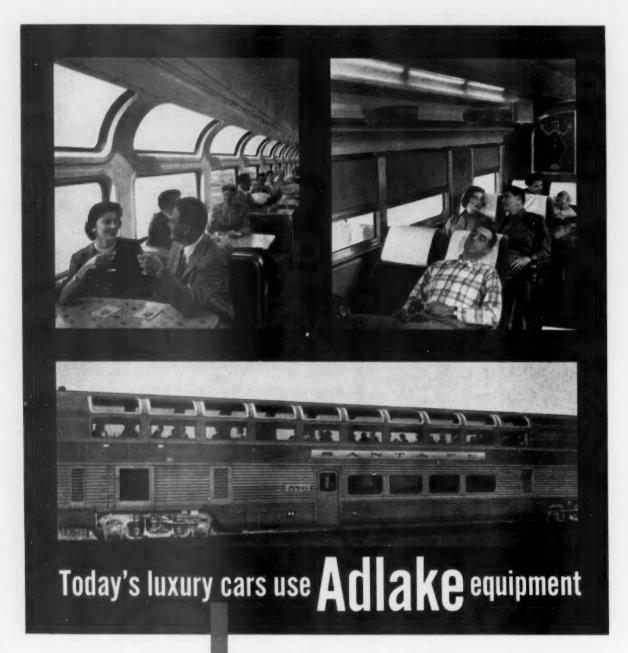
Griffin Wheel Company
445 N. Sacramento Bivd., Chicago 12
Plants strategically located to serve all railroads







Give the "green" to GRIFFIN and watch your costs go down!





Manufacturers of Adlake Specialties and Equipment for the Railway Industry Adlake products are used on the finest passenger cars, so naturally you would expect to find them on the Santa Fe's new cars for its famous El Capitan.

Adlake windows, curtains and hardware are on the 47 new cars built by The Budd Company for the Santa Fe.

For full information on Adlake railway equipment, write The Adams & Westlake Company, 1152 N. Michigan, Elkhart, Ind.

#### The Adams & Westlake Company

Established 1857 · Elkhart, Indiana · New York · Chicago



AR TYPE



#### For Freight Car Journals

- Positive mechanical delivery of oil of any viscosity in sufficient quantity to afford bath lubrication.
- · Performance unaffected by heat or cold.
- Requires no attention other than additional oil as needed.
- Distributor part AR-1 renewal at 3-year intervals.
- · Life of other parts unlimited.
- Eliminates hot boxes from usual causes.
- Reduces frictional resistance.
- Increases bearing life.

Hennessy Lubricator Co., Inc. has been engaged in the manufacture of mechanical lubricators for journals of railway equipment since 1922.

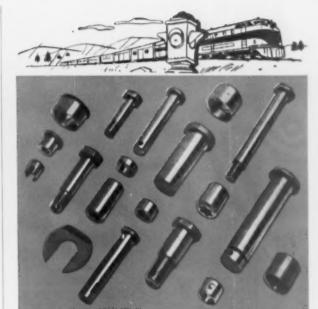
AR Type Lubricator for freight car journals in use since 1952.

More than 5,000 car sets have been sold; more than half of these have been in interchange service since 1953.

#### HENNESSY LUBRICATOR CO., Inc.

605 Guilford Ave.

Chambersburg, Pa.



## Large Stocks-

Mass produced for low cost

EX-CELL-O PINS AND BUSHINGS

are saving money for more than 200 railroads and equipment builders. These hardened and ground steel railroad products have

been an Ex-Cell-O "specialty" for over 25 years.

Whether you buy one or a thousand, prices are low. Prompt shipment allows you to keep down your inventory.

EX-CELL-O WAS FIRST to establish stocks of popular sizes for all types of equipment; and FIRST to offer the economy of mass-produced replacement items.



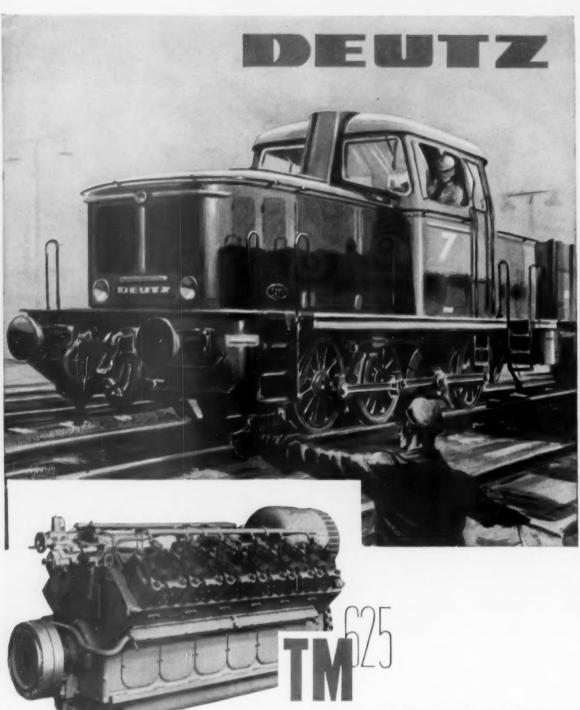
Do you have this recently-revised catalog—or can you use more of them? Write Ex-Cell-O for copies.

56-31

RAILROAD DIVISION

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN



DIESELLOCOMOTIVES

powered by slow-speed 2-stroke DEUTZ diesel engines and equipped with hydraulic transmissions, for shunting and line service, with 4 to 12 cylinders, output ranging from 240 to 2000 HP

#### KLÖCKNER-HUMBOLDT-DEUTZ AG. KÖLN

(Germany)

Address inquiries from U. S. A., Alaska, Hawali and Puerto Rico to: Diesel Energy Corporation, 143 Liberty Street, New York 6, N. Y.



Laying and welding N-S-F in one of 800 new boxears at Great Northern's St. Cloud, Minn. shops.

#### N-S-F\* helps THE



#### **BUILD FOR THE FUTURE**



Railroad inspector giving N-s-F a final check as new Great Northern boxcar rolls off the road's final assembly line at St. Cloud.

Cars equipped with NAILABLE STEEL FLOORING enable progressive railroads to furnish shippers with Class A cars for all kinds of ladings—and safer cars, too, for shippers' personnel. Moreover, N-S-F is a flooring that can make for substantial savings over the years in both original investment and maintenance costs. It is equally economical in either new or used cars.

Pertinent, timely performance and cost studies are available from N-S-F representatives in Chicago, New York, Philadelphia, St. Louis, Cleveland, San Francisco, Minneapolis, Atlanta and Montreal.

N-S-F (TM): NAILABLE STEEL FLOORING Made and sold only by-







## HOW GOOD IS THE FINISHED PRODUCT?

Whether you are concerned with manufacturing or with purchasing rolling stock, these are questions of vital concern to you—for ultimately they govern the durability and cost of the end product. Here is just one example how Heliarc welding is helping railroads gain new product quality at substantial savings... the unit being fabricated is a galvanized iron and mild steel refrigerator car.

#### Welding Speeds Average 30 In. Per Minute

Semi-automatic welding requires no special skill, and speeds two to three times faster than manual welding can be easily maintained. The Hellarc welded side and floor panels shown are fabricated of 14 and 20 gage galvanized iron and mild steel.

#### 309 Ft. Of Top-Quality Welds Per Car... Minus Flux

In HELIARC welding, argon gas automatically shields the weld puddle from contaminating effects of the atmosphere. All 31 butt, lap, and flange joints in each car are of the highest quality.

Find out about the particular welding installation that can increase your production speed and unit quality. Call your local LINDE representative for detailed information on LINDE's modern methods for joining metals.



Semi-automatic HELIARC welding torch speeds and simplifies fabrication of refrigerator cars.

#### RAILROAD DEPARTMENT

#### Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street TR New York 17, N. Y.

Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY Division of Union Carbide Canada Limited, Toronto

"Linds" and "Haliare" are registered trade marks of Union Carbide and Carbon Corporation.

Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under the familiar symbol - - -

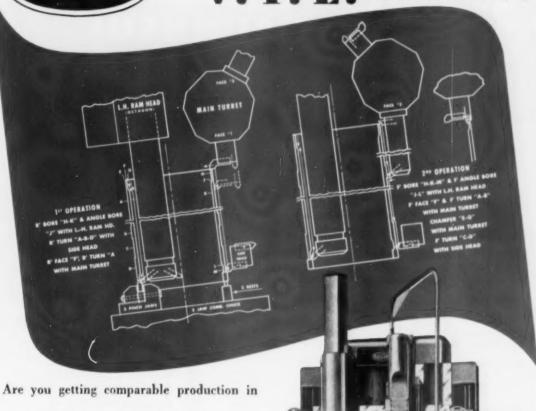


Here is a Time and Cost Saving Method of Machining

DIESEL CYLINDER LINERS

with a BULLARD

CUT MASTER V.T.L. MODEL 75



Are you getting comparable production in your shop? If not — you should and you can.

Just call your nearest Bullard Sales Representative for full details or write to

THE BULLARD COMPANY BRIDGEPORT 2, CONNECTICUT



#### . . . guards perishables under ALL conditions!

Major refrigerator car builders have been using all-hair insulation for nearly half a century — and today they specify Streamlite HAIRINSUL because of its 40% less weight, higher efficiency and greater economy.

At any location, at any temperature Streamlite
HAIRINSUL provides maximum protection to valuable
shipments of perishables.

Yes, Streamlite HAIRINSUL assures you all the major advantages listed at the right — and more besides. Write for complete data.

#### AMERICAN HAIR & FELT COMPANY

Merchandise Mart . Chicago, Illinois

- LOW CONDUCTIVITY Thoroughly washed and sterilized, all-hair heat barrier, Rated conductivity .25 btu per square foot, per hour, per degree F., per inch thick.
- LIGHT WEIGHT Advanced processing methods reduce weight of STREAMLITE HAIR-INSUL by 40%.
- PERMANENT Does not disintegrate when wet, resists absorption. Will not shake down, is fire resistant and odorless.
- EASY TO INSTALL Blankets may be applied to cur wall in one piece, from sill to plate and from one side door to the other.
   Self-supporting in wall section between fasteners.
- COMPLETE RANGE STREAMLITE HAIR-INSUL is available ½" to 4" thick, up to 127" wide. Stitched on 5" or 10" centers between two layers of reinforced asphalt laminated paper. Other weights and facings are available.
- HIGH SALVAGE VALUE The all-hair content does not deteriorate with age; therefore has high salvage value. No other type of insulation offers a comparable saving.



SETS THE STANDARD BY WHICH ALL OTHER REFRIGERATOR CAR INSULATIONS ARE JUDGED.

Spray, brush er rell ADM Freight-Liner 810 on wood or metal areas to be patched. Freight-Liner plastic is ready-to-use as it comes from the drum. Standard spray equipment can be used. No special surface preparation required.



Apply Freight-Liner Fiberglass over the area to be patched while first coat of Freight-Liner 810 plastic is still wet. Fiberglass can easily be cut with shears to desired size. ADM Freight-Liner 810 plastic plus reinforcing cloth gives a finished tensile strength of 11,125 paunds per square inch.



Apply second Freight-Liner \$10 coating to impregnate reinforcing fiberglass. Coating oir dries rapidly to tough, smooth, abrasion-resistant surface. Seals out dirt and insects. Where large broken areas require added strength, the coatings may be laminated in several layers.

# Now (1)0 Men Can Upgrade 30 Cars A Day!

Pick any two men in your yard crew! With an hour's training, they can upgrade 30 cars a day with the ADM Freight-Liner 810. They just follow three simple steps shown in the unretouched photos at the left.

In a matter of minutes this car was upgraded and ready for a bulk lading. Cost of labor and materials for spot patching was only 15 cents a square foot.

Whether you are patching with Freight-Liner 810 or completely relining cars with Freight-Liner 7115, the ADM Freight-Liner System is fast, low cost and practical.

Apply at any location, in any weather.

In service for over two years, the ADM Freight-Liner System not only upgrades cars faster but reduces both damage claims and per diem charges. Claims for sacks and packaged goods torn in transit are drastically reduced. Leakage of bulk shipments is controlled.

Qualified ADM service engineers provide everything needed to start your yard crew on an upgrading program. For an ADM Freight-Liner System demonstration on your own cars at any track location, write, wire or phone (FEderal 3-21<sup>1</sup>2—Minneapolis) ADM Freight-Liner System, 737 Investors Building, Minneapolis 2, Minnesota.

ADM

Freight Liner

ArcherDanielsMidland
company



OTHER ADM PRODUCTS Linseed, Sorbean and Marine Oils, Paint Vehicles, Synthetic and Hatural Resins, Polyesters, Fatty Acids and Alcohols, Mydrogenated Glycarides, Sparm Oil, Poundry Binders, Indistrict Cereals, Vegetable Proteins, Wheat Floor, Dehydrated Alfalfa, Livestock and Poultry Feeds.

# General Electric Parts Centers are Ideally Located to Give You Quick, Efficient Service

General Electric Railroad Regional Parts Centers are now located at five key points in the United States to provide convenient, prompt, and dependable parts service to those railroads operating General Electric locomotives and equipments.

Replacement parts, including Unit Exchange components, are warehoused at each Regional Parts Center so that your parts requirements may be quickly serviced. The Center serving your area has the latest design General Electric replacement parts in stock which permits you to carry a minimum inventory and to save

transportation time and expense.

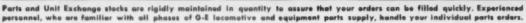
Each of the G-E Parts Centers is staffed by experienced personnel familiar with all phases of General Electric locomotive and equipment parts replacement. General Electric locomotive Parts Specialists are always available to assist you with all of your parts needs.

You can obtain General Electric Regional Parts service through your locomotive builder or by directly contacting the G-E Parts Center located nearest to you.

Locomotive & Car Equipment Dept., General Electric Co., Erie, Pa. 128-30







Progress Is Our Most Important Product

GENERAL ELECTRIC



## GENERAL ELECTRIC RAILROAD REGIONAL PARTS CENTERS

CHICAGO CENTER

4956 South Major Avenue Chicago 38, Illinois **ERIE CENTER** 

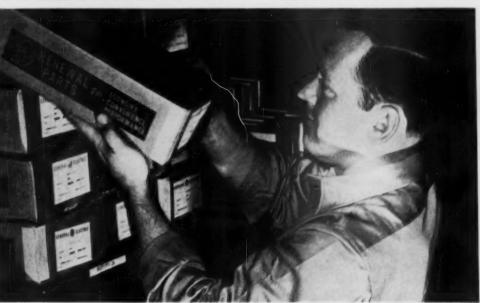
2901 East Lake Road Erie 1, Pennsylvania

#### ST. LOUIS CENTER

4050 Bingham Avenue St. Louis 16, Missouri

#### ATLANTA CENTER

488 Glenn Street Atlanta 3, Georgia



G.E.'s five Parts Centers can quickly fill parts orders from locomotive builders using G-E equipment or from railroads with General Electric rolling stock.

now's the time to



switch

to CP cold riveters



Right now car builders and railroad shops are "swamped" with a record backlog of 169,541 new car orders... the highest in over thirty years. You'll never have a better opportunity to "cash-in" on the production economies of CP Cold Riveting Equipment!

CP Cold Riveters not only help increase car production but they cut production costs as well. Their easy handling qualities, large tonnage capacity and accurate pressure control permit one-man operation . . . there are no manhours lost for time-wasting, heating and "bucking-up." And sections can be stationed with fewer drift pins . . . the operator quickly inserts rivets by hand. Compact CP Hydraulic riveting equipment is available in stationary and portable models for driving cold rivets up to 1". Write for complete details. Chicago Pneumatic Tool Co., 8 East 44th Street, New York 17, New York.

Chicago Pneumatic

SPEED RECORDERS AND INDICATORS . STATIONARY AND PORTABLE AIR COMPRESSORS . PNEUMATIC AND ELECTRIC TOOLS . HYDRAULIC RIVETERS

conceptions in components create new and better cars... it is difficult



to show the impact of NTERNATIONAL STEEL'S corrective component engineering without picturing completed cars in our advertisements

this has led many to believe that we are car builders.

the are not

we are precision fabricators of correctively designed such as ...

underframes and bulkheads for bulkhead flat cars, pulpwood



cars and piggy back cars... underframes, side assemblies and floors for gondolas... underframes, bulkheads and doors for the unit load car...
underframes, side assemblies and doors for box cars...

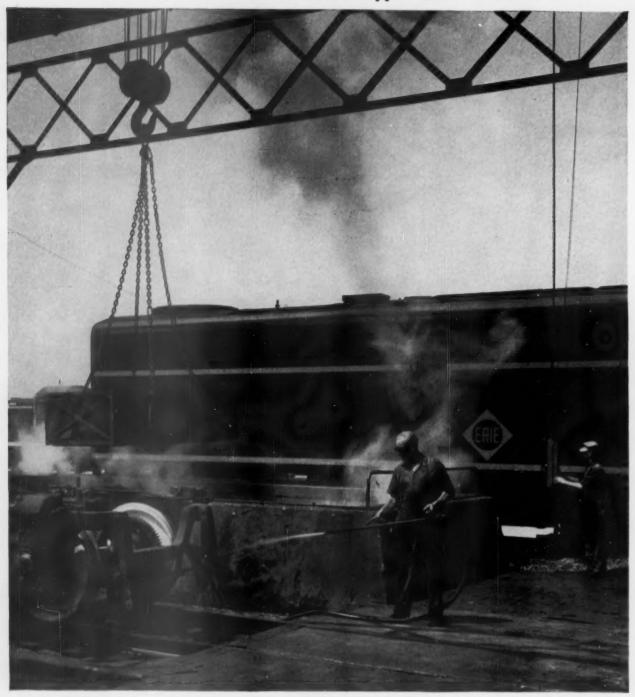


underframes, side assemblies and hoppers for hopper cars . . . underframes, side assemblies and doors for refrigerator cars . . . underframes for cabooses

component conception for profit potential . .

NTERNATIONAL STEEL COMPANY

## Erie Railroad finds Wyandotte-11





### Vat Cleaner effective for almost a year

#### ... and lowers cleaning costs to only 21/2¢ per ton!

The Marion, Ohio, shops of the Eric Railroad are justifiably proud of their efficient cleaning operations. As a part of their continuing program to improve these operations, they charged their 20,000-gallon vat with a 6 oz./gal. solution of Wyandotte-11 Vat Cleaner in July of 1955. Almost a full year later, in March, 1956, they found that the vat still titrated at 3 oz./gal., and continued to give them good cleaning results.

In this period, approximately 14,400 tons of parts were cleaned—diesel trucks, wheels, engine parts—about everything that can be cleaned in an alkaline vat. Yet, their cleaning costs were only \$.0258 a ton, using Wyandotte-11!

Wyandotte-11 has many advantages which the Erie

and other railroads appreciate in their cleaning operations—good emulsifying characteristics, long service life, free rinsing, 100% solubility in water, controlled uniform quality, and low use-cost.

The above is but one example of the remarkable effectiveness of the many Wyandotte products used in railroad-cleaning operations.

Call in your Wyandotte railroad-cleaning specialist. Let him show you how Wyandotte products can do your toughest cleaning jobs better, faster, and at lower cost. Or, for further information on Wyandotte-11, or other railroad-cleaning products, send in the coupon below, today! Wyandotte Chemicals Corporation, Wyandotte, Mich. Also Los Nietos, Cal. Offices in principal cities.

#### Wyandotte products meet all your railroad cleaning requirements

OPERATION	PRODUCT	TYPE
Exterior Diesel Cleaning	Wyandotte-548 Wyandotte-75 Rillor*	All-soluble alkaline High-detergent acid Alkaline (Bentonite promoted)
Interior Diesel Cleaning	Wyandotte-548 Wyandotte-701	All-soluble alkaline Solvent-emulsion
Exterior Passenger-Car Cleaning	Wyandotte-85 Wyandotte-548	Acid All-soluble alkaline
Vat Cleaning	Wyandotte-11 Altrex*	For ferrous parts For aluminum parts
Steam-Gun Cleaning	Wyandotte-589 Wyandotte-701 Altrex*	Heavy-duty alkaline Solvent-emulsion Inhibited alkaline
Paint Stripping	Wyandotte-21 Sprazee*	Heavy-duty alkaline Organic
General, All-Purpose Cleaner	Rantier	For floors, pits, diesel radiators, etc

#### CUT AND MAIL COUPON TODAY

\*Reg. U. S. Pat. Off

WYANDOTTE CHEMICALS CORPORATION WYANDOTTE, MICHIGAN	Name		
Gentlemen: I would like more information on	Railroad		
Wyandotte-11	Department		
Other Wyandotte railroad	Address		
cleaning products	City	Zone	State

## Nation-Wide Availability TEXACO DIESEL FUELS





EDITORIALS . . .

#### How To Be a Better Supervisor

Some time ago a personnel man gave a talk that contained a few gems of wisdom on the art of getting along with your co-workers that seem worth passing on. His ideas should interest a wide range of railroad men. Some apply to dealing with your boss. Others apply to dealing with the people you supervise. Some apply equally well to either condition.

The first piece of advice was that you should always go to the boss with an idea—not for an idea. And when your subordinate comes to you with a problem, keep joint control of the decision. Don't lose face by saying, "Use your own judgment" or "You figure it out." A better answer is usually somewhere along the lines of saying, "How do you think we should handle it?" Besides keeping joint control of the decision, this gets the subordinate to handle his share of the load and teaches him responsibility. It further takes advantage of the ability of the man who is doing the job and is closest to it. Remember that he is the one who knows that job best.

It is, of course, easier to institute this practice of joint decision with those under you than those over you. Yet establishing the practice between you and your subordinates can help you to get the boss to delegate authority to you. When he sees how well it works between you and the people over whom you have supervision he may try out the idea with those over whom he has supervision.

Open mindedness is a key quality that makes for the kind of relationship that leads to effective joint decisions. The good supervisor listens to advice and ideas from his subordinates, and gives them credit for thoughts and practices which they originated. By guarding against a closed mind or know-it-all attitude he avoids having his subordinates attribute such slogans to him as, "My mind's made up—don't confuse me with the facts."

Open-mindedness has the further virtue of facilitating a broad understanding of your job and how it fits into the overall task of running a railroad. It makes it possible to explain why a thing has to be done instead of merely telling someone to do it. It avoids having your company (and maybe your actions, too) tagged with the old slogan, "No reason for it—just company policy."

Advice on how to get along with people is always worth considering and analyzing (although, of course, not all of it is worth accepting). It has been proved many times in industry generally that ability to get along with people contributes more to your success or failure on the job than any other factor—including technical knowledge. While there are no general surveys we know of on this subject in the railway field, it seems quite probable that the same findings would prevail.

#### Let's Get Out the Yellow Paint

Complaints are increasing about the failure to apply yellow paint to the lids of journal boxes equipped with the different types of new lubricator pads—and with good reason. The new type pads emit no smoke and make no "stink" as they are getting hot. Thus they don't warn against an impending hot box like waste.

It is true, of course, that once the box gets hot enough the oil will blaze away, smoke just as much and smell just as bad regardless of whether a waste-type or a pad-type lubricating medium is used. But it is often too late when this symptom appears.

A couple of examples cited at a meeting of the Superintendents' Association show what can happen. A covered hopper loaded with 75 tons of cement was examined by both the incoming and outgoing conductor as it passed by at 7 or 8 mph. No sign of a hot box was present. When an incoming caboose stopped opposite the car, the conductor was able to see a slight whiff of smoke. The journal was red hot—yet there was no odor, no flame and just a trace of smoke. The car probably would not go five miles.

The journal was badly scored, the brass about to break up and the packing glazed over. While there was plenty of oil in the box, the glazing prevented it from reaching the journal surface.

The second example was a 70-ton hopper which passed a section gang only three miles before the journal burned off. Furthermore, the car was close to the head end where it was easy to see any visual signs of trouble. Yet nobody was able to detect any warning signal.

Yellow paint on journal box lids will not completely cure the troubles with the new lubricator pads any more than the pad will completely eliminate the hot box. But it can help by pointing them out for the inspector to feel. The preceding examples show that this precaution is more important than many realize. The success of these pads in reducing hot boxes as reported by several roads at the last AAR meeting indicates their possibilities in helping to lick the hot box problem. Let's give them every chance—including diligent adherence to the recommendation to paint the lids of the boxes yellow.





## The young man in your future

He has just turned 21. In June he graduated with an engineering degree. Then, with a carefully selected number of similar graduates, he began the engineering training program at Wilmerding and started to learn about air brakes and railroading.

During the course of this program he acquires background information with respect to design, operation and maintenance of air brake systems. He takes air brakes apart. He puts them together. He tests them. He helps design and improve them. He operates them in the laboratory and on prototype trains. He visits railroad shops and observes the maintenance of Westinghouse Air Brake equipment. A year and a half later he is ready to enter the engineering or sales department, instilled with the high safety standard inherent in Westinghouse Air Brakes and determined to do his part in maintaining this traditional standard.

We are counting on this man not only for his new ideas, but also for his ability to maintain and transmit the fundamental traditions of George Westinghouse in promoting safety, dependability and economy of train operation.

Westinghouse Air Brake

AIR BRAKE DIVISION X WILMERDING, PENNA.

## **MORE ECONOMIES AHEAD**

### with Standard Solid Bearing Assemblies

Why and how elimination of "loose" waste and adoption of "controlled clearance" bearings will still further increase economic advantages of low cost Solid Bearings

Y OU SAVE real money now with standard solid bearing assemblies. And soon you'll be saving even more — for two big reasons.

First, there's the program now in force to equip freight cars with "controlled clearance" bearings—standard bearings with finished bore diameters much closer to journal diameters on which they operate. You get a big extra margin of safety during initial run-in periods, and the time for run-in is greatly reduced. Right at the start the bearing load is distributed over a wide area. That's going to greatly increase bearing life.

Second, there's the program now under way to eliminate "loose" waste—either by using approved pad or mechanical lubricators, or by using an approved device to contain the lubricator—such as the R-S Journal Stop that performs the dual function of eliminating excessive axle displacement at the same time that it anchors the lubricator (whether waste or not) firmly in position.

As soon as "loose" waste is eliminated, you'll see a big drop in routine servicing costs and another big jump in bearing performance. Three year periods between detailed bearing inspection are in prospect, too — you'll halve those costs for periodic attention.

There's no question about it. Solid bearings save you money now, and they'll save you more in the future. Then, too, you'll still have all the inherent advantages which solid bearings bring to railroad rolling stock. You can take the maximum load, make the fastest schedule. You save in unsprung dead weight, and you get the smoothest ride on any freight car truck. Best of all, you'll get top bearing performance at the lowest possible cost. Magnus Metal Corporation, 111 Broadway, New York 6; or 80 E. Jackson Blvd., Chicago 6, Illinois.

Solid Bearings

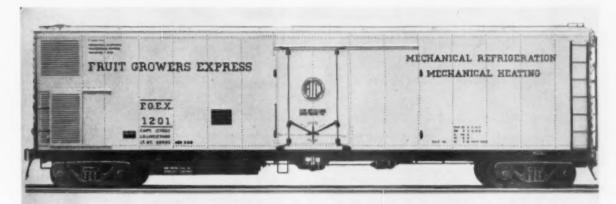
MAGNUS METAL CORPORATION

Subsidiary of NATIONAL LEAD COMPANY



#### MECHANICAL REFRIGERATION-PART I





BRE-FGE-WFE now run more than 1,000 of these cars.

### What's In Today's Mechanical Reefer?

Diesel engine, a-c electrical system, refrigerating and heating equipment, and complicated controls are all part of cars incorporating the latest in car-building techniques.

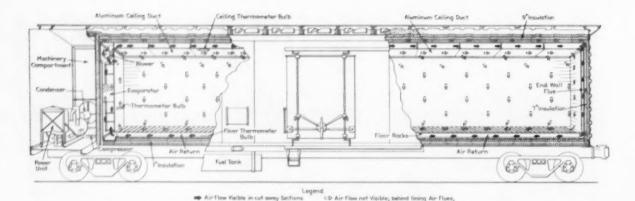
The mechanical refrigerator cars operated by the associated Burlington Refrigerator Express, Fruit Growers Express and Western Fruit Express can take it. Recently a southeastern railroad had a derailment involving a train having in its consist three of these mechanical refrigerator cars loaded with frozen citrus concentrates. Two of the mechanical refers rolled over on their sides and the third was shoved up onto one end. The fuel tanks were torn off all three cars.

The three cars were finally righted by the railroad wrecker, and were set clear of the track—still off their trucks. Barrels were utilized for temporary fuel tanks and it was found that the diesel engine in each car could be started again. The car bodies had not been broken open, and the thermal insulation had kept the lading of all three cars from thawing. While the wreck was being cleared, the refrigerating systems on these cars were operated, and there was no damage to the frozen juices they contained. Fruit Growers Express has recently completed the last of 400 new mechanical cars which brings the ownership of the associated companies to over 1,000 cars. And already these companies have 230 additional units on order for earliest possible delivery. This is evidence of how rapidly demand is expanding in this field—an operation initiated by FGE in 1948.

The 400 cars just completed by Fruit Growers are typical of the equipment and techniques utilized in today's mechanical refrigerator cars. These cars are nominal 70-ton, 50-ft units. Actual capacity is 128,000-lb. They have steel underframes with allriveted, steel-sheathed superstructures. At the A-end of the car is an engine compartment 4-ft 8-in. long containing the generating and refrigerating equipment. This is separated from the load-carrying space by an insulated partition behind which are the evaporator and blower. Air from the blower is circulated through a ceiling duct and through flues in the side and end walls, then is returned under the floor racks to the evaporator.

The cars were assembled by the BRE-FGE-WFE organization at the company shop at Alexandria, Va. Subassemblies were purchased from various railway supply companies. Cars roll on Hyatt 6 x 11-in, roller bearings and are equipped with onewear wrought steel wheels. The 70ton trucks are of the pedestal, springplankless type with 3-11/16-in. spring travel and Henry Miller coil springs. Trucks for half of the order are equipped with SCT Barber S-2-C stabilized control, and the remainder have ASF A-3 ride control. Bolsters are equipped with Stucki roller side bearings. There are Unit Brake beams and Schaefer brake linkages.

Underframes were supplied by ACF Industries. They are all-welded assemblies of copper bearing steel. AAR 51.2-lb Z-sections form the center sill, and side sills are 15.3-lb 6-in. channels. End sills are 21.3-lb 8-in. channels. Bolsters and crossbearers are assembled from  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{5}{8}$ -in. plate, and crossties are  $\frac{3}{8}$ -in. pressed channel shapes. Allied strikers and Buckeye center fillers are used. Na-



Air distribution through body of the mechanical refrigerator car provides for air flow behind all surfaces of the loading space. Fruit Growers latest, the 1201-1600 series, weighs 82,600 lb with 3,034 cu ft

of loading space. Over strikers the car is 52-ft 5½-in, long. Loading space length is 44-ft 5½-in, and its width is 8-ft 8-in. From the top of the floor racks to the ceiling duct is 7-ft 10½-in.

tional Malleable's rigid shank "E" couplers and MF-275 rubber cushion draft gears, and Standard uncoupling devices are utilized.

The side assemblies are of copperbearing steel and were built by Youngstown Steel Door Co. The side sheets are of 0.10-in, material. Vertical posts are 3-in. 5.1-lb Z sections with 8.3-lb Z's for door posts. Side plates are pressed from ½-in, material and side angles are ½ x 6 x 6-in, angles. The assemblies have brackets and other features for application of the interior finish. Mulehide paper and Dearborn No-Ox-Id cement are used at all metal-to-metal contact points throughout these riveted assemblies. Youngstown 6-ft wide sliding doors with Camel fixtures are standard. Copper bearing steel is used in the Standard Railway Equipment two-piece Dreadnaught ends and in the diagonal-panel roofs.

The  $\frac{3}{32}$ -in. Cor-ten sub floor applied to the top of the underframe, the sides, doors and ends are coated with Mortell Insulmat prior to the application of the insulation inside the car. Joints between the floor and walls are vapor sealed with Presstite plastic cement. Three layers of muslin-covered Hairinsul from the 7-in. thick floor insulation. The 7-in. in-

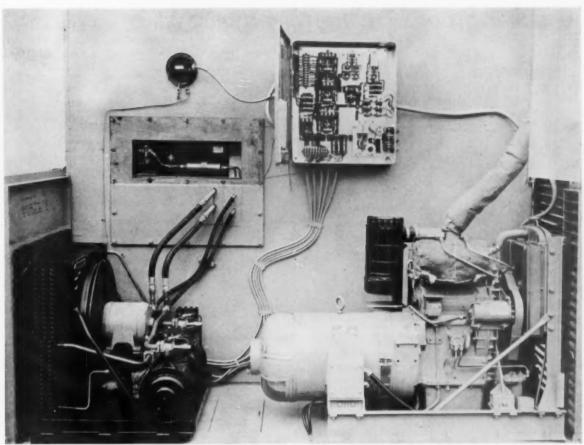
sulation in the walls, doors, end and bulkhead is two and three layers of Gustin-Bacon Ultralite in 1 and 1½ lb density. Roof insulation is 9-in. thick comprised of three layers of ¾-lb Ultralite. A paper air barrier is used with the insulation throughout the car.

Wood framing, lining and flooring are all thoroughly-dried Douglas fir. The 6-in. high Herringbone-type floor racks have white oak slats, Unitcast Pin-less hinges, and Azee wall-type rack holders. The ceiling air duct is formed by placing 0.064-in. aluminum sheets 6-in. below the tongue-and-groove ceiling. It is continuous

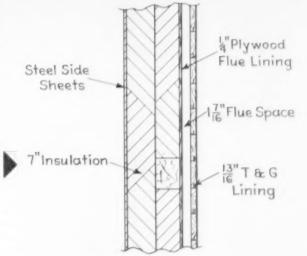
#### BRE-FGE-WFE MECHANICAL REFRIGERATOR CAR FLEET

			Compressor							
		Nominal	Se	rvice	Ту	pe	/	rrangement		Numbe
Initials	and numbers	length (ft)	Zero	All- Purpose	Open	Sealed	Single	Tandem	Dual	Cars
FGE	105	40	200.0	×	×		X			1
FGE	111	40		×	×		×			1
FGE	115- 116	50		X		X			×	2
BRE	117	50		X		X	×			1
BRE	118	50		×	×		X			1
BRE	119	50		×	×		×			1
BRE	120- 149	50		X		×			×	30
FGE	150- 199	50		×		X			×	50
FGE	205	50		×		X	×			1
FGE	207	40	×		×		×			1
FGE	208	40				×	X			1
FGE	209- 224	50	×		×			×		16
FGE	225	50		X		×			X	1
FGE	226- 249	50	×		×			×		24
FGE	250- 299	40	X		×		X			50
FGE	340- 398	50	×		X			X		57
FGE	399	50		X		×			×	1
WFE	800- 849	50		X		X			X	50
WFE	890- 899	40		X		×			×	10
FGE	1000-1099	50		X		X			X	100
FGE	1101-1200	50		X		X			X	100
FGE	1201-1600	50		X		X			X	400
WFE	8000-8099	50		×		X			X	100
FHIX	41047	40		X		X			X	1
FHIX	41127	40		X		X	×		X	1
								Tot	tal Cars	1001

<sup>\*</sup>For fresh commodities only.



Machinery compartment of FGE mechanical refrigerator car. At right is the diesel-alternator and at left is the dual compressor-condenser unit. On left of the bulkhead is the refrigeration control panel including heat exchangers. To the right is the electrical control panel. Above the refrigeration panel is the pressure-differential defrost switch.



Side construction section shows relation of components and explains how the air duct is built into wall. In addition to materials shown, layer of cement is placed on steel side, air barrier paper layer is placed between two courses of insulation, and waterproof paper is located between inner course and plywood flue lining.

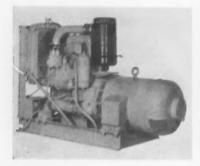
SECTION AT SIDE WALL

without shutters. Air then passes down into 1-7/16-in. flues in the sides, ends and doors.

The cars have Apex running boards and brake steps, and Wide side and end ladders. Cars are painted with Automotive Finishes products, and the underframe is coated with Insulmat. Wood lining is finished with refrigerator car varnish. Westinghouse and New York Air Brake AB brakes with 10 x 12-in. cylinders, Royal type F slack adjusters, and Universal nonspin hand brakes are applied.

The 400-gal, fuel tanks are built by Youngstown Steel Door and have Crane fittings. Nathan fuel sight gauges can be read from each side of the car. Each car has a pair of Liquidometer thermometers indicating temperatures at the floor and

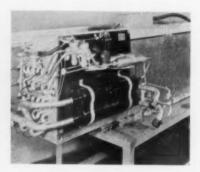
#### Components of FGE Refrigeration System . . .



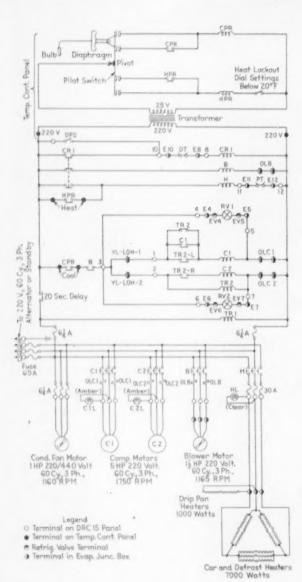
Diesel Alternator



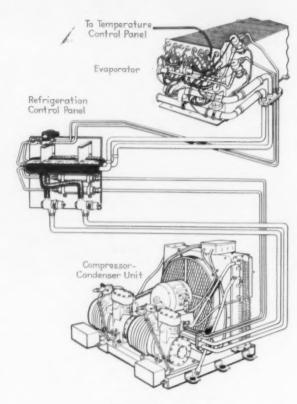
Compressor-Condenser



Evaporator and Controls



ELECTRICAL SYSTEM



REFRIGERATION SYSTEM

LEGEND

CPR—Cooling Pilot Relay
HPR—Haating Pilot Relay
DPS—Defrost Static Pressure Switch
PT—Protective Thermostat
DT—Defrost Thermostat
CR1—Cantrol Relay
B—Blewer Metar Starter
H—Heater Contactor
RV1, RV2—Refrigerant Valves
TR1—Control Circuit Timer
TR2—Sequence Starting Timer
YL-LOH 1—Hi-Lo Pressure Cutout
YL-LOH 2—Hi-Le Pressure Cutout

C1. C2—Compressor Motor Starters
C1L—Compressor #1 Indicating Light
C2L—Compressor #2 Indicating Light
HL—Heater Indicating Light
OL—Thermal Overload Protectors
All tutes time delay type
TR2 Contact—Slew Break
TR2-L Contact—See Delay
TR2-R Contact—See Delay
C1 Contact—Tast Mace
TR1 Contact—3 Sec Delay
Lecks heat out at dial settings
below 20 deg F

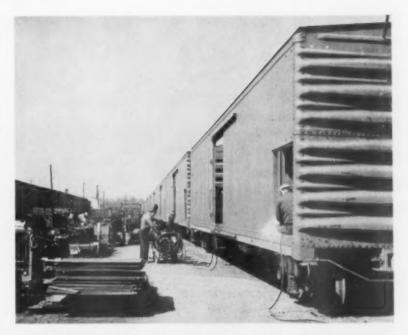
ceiling. These cars are designed for a refrigeration tempertaure range from minus 5 to 701deg F—are designated by Fruit Growers as "all purpose" cars. This means that they provide for cooling and/or electric heating as required by the thermostat setting.

Power for the refrigeration, heating and air circulation systems is provided by a 20-kw General Motors diesel alternator. The two-cylinder, two-cycle engine has 4½-in. more and 5-in. stroke. It is directly coupled to the alternator and is governed to operate at 1,200-rpm. The engine also has a separate 12-v. generator for charging the Delco starting battery which is located in a small battery box reached through the floor of the machinery compartment.

The Frigidaire refrigeration system is a split type with dual compressors operating two separate refrigerant loops filled with Freon-12. Each of the one-cylinder compressors is driven by a 220-v, 5-hp induction motor. The split condenser is mounted on the same base with the compressors and refrigerant receivers. The condenser fan is operated by a 1-hp motor operating at 1,150 rpm. The high pressure liquid Freon is further cooled enroute to the evaporator by passing through heat exchangers cooled by Freon vapor returning from the evaporator. The evaporator is a split type with two expansion valves and duel sets of coils. Resistance type heater rods are also installed in the evaporator for both automatic heating and for defrosting during refrigerating operations. Total heating capacity is 8,000 watts. Rating of the refrigerating system is 10 tons. Air is circulated at the rate of 4,500 cfm.

A transformer provides 25-v current for operation of a thermostat. A diaphragm-actuated switch controls the heating and cooling operations through this circuit. The diaphragm is actuated by a temperature bulb installed in the air duct. Defrosting of these latest cars is controlled by a pressure-actuated switch which measures the pressure differential across the evaporator coils. Earlier cars have a defrost clock which puts the defrosting cycle into operation every 8 hours.

Full load operation of the diesel alternator consumes fuel at the rate of approximately one gal. per hour and diesels never are shut down while the car is loaded. The two compressors are independent of each other,



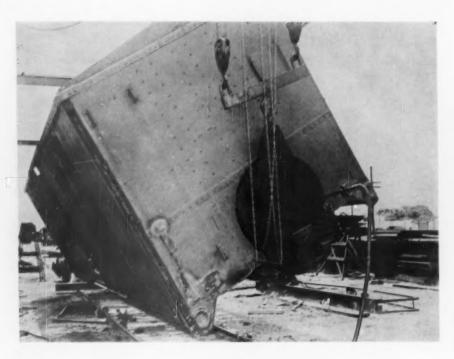


Assembly line at Fruit Growers shop at Alexandria put 400 latest mechanical cars together at rate of five per day. Refrigerating equipment on unloaded cars was put into operation and cars were sent to Florida where they were inspected to determine if they operated satisfactorily. They then went on for loading.

and controls provide for serial starting of both machines. There is no provision for operating only one compressor at light cooling loads. Both are cycled on and off by the temperature control panel. The system has proved its ability to maintain very steady temperatures at any setting. Movement of fresh fruits and vegetables at temperatures above freezing is done with a combination of heating and cooling, while for transportation of frozen foods there is continuous cooling except during de-

frosting periods. The control system provides for automatically locking out the heating function at all temperature settings below 20-deg F.

The BRE-FGE-WFE organization has accumulated a great deal of experience in servicing and maintaining these cars. This will be described in future installments. Operating techniques for these \$22,000 cars are important, not only because of their cost, but because of the growing amount of traffic they are handling and attracting.



Hoisted free of its trucks, this box car is easily rotated to allow Unionmelt welding on each side.

### How SAL Applied New Box Car Sheathing

When the Seaboard used steel sheets to replace wood sheathing on 20% box cars, the Linde Unionmelt process was used. Two of the Unionmelt welding machines teamed with a turnover jig were responsible for the production speed and efficiency attained. By using the Unionmelt process, average welding speed was tripled and weld quality improved over previous fabricating methods.

After removal of the wooden sides, ½-in, steel sheets were tacked to the original car structure. Butt seams were located over the side posts which then served to back up the Unionmelt welding. Moved to the turnover jig. each car was then lifted off its trucks, tipped, and placed on its side. This jig simplified both handling and welding operations.

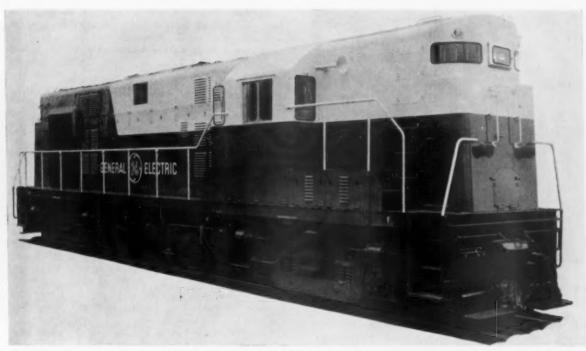
All joints were sand blasted just before welding was started. Two carriage-mounted welding machines made the eight 8-ft 3-in, butt welds and two 14-ft 6-in, fillet welds on each side. Upon completion of one side, the car body was lifted, turned 180 degrees, and set down for welding of the second side. Welds required no subsequent stress relief. Seven welders and two helpers turned out four rebuilt box cars per day.



Making a high-speed butt weld in box car side. Car side posts served to back up Unionmelt welding.



Box car on its side in the turnover jig. Here side sheets are fillet welded to the side sill.



Heaviest of nine standard export locomotives, this 1,980-hp unit tops a line which includes five lighter or lower powered road-switchers, and 400-hp and 600-hp switching locomotives.

#### First of nine standard models, this 1980-hp unit is . . .

### Largest GE World-Market Road-Switcher

Built for demonstration purposes and already in Mexico is the largest of General Electric's new standard line of universal road-switcher type diesel-electric locomotives

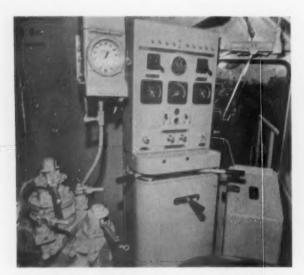
Cooper-Bessemer four-cycle, V-type diesels have two turbochargers one for each bank of cylinders. Between supercharger and cylinders is the aftercoolor which lowers inlet air temperature.

for the world market.\* It is equally adaptable to all services—switching, freight, or passenger—where its high horsepower can be utilized to advantage, and axle loadings and clearances are not a limitation.

The universal locomotive line is the result of extensive development aimed at simplification of construction, ease of maintenance, and increased reliability in service. Each component was evaluated to assure the highest quality consistent with economy. Maximum use of standard interchangeable parts serves to reduce the initial cost, simplify operation and maintenance, and minimize renewal parts stocks.

The locomotive is powered by 1,000-rpm, 1,980 hp, Cooper-Bessemer Model B-12, 12-cylinder, V-type, 4-cycle, turbosupercharged diesel engine with 9 x 10 ½-in. cylinders arranged in two banks at an angle of 45 degrees to each other. Each cylinder has two intake and two exhaust valves. The cylinder and cylinder head are an integral casting with a removable chrome-plated cylinder liner. This eliminates gasketed joints and improves the heat flow characteristics of the cylinder head. Cylinders and heads are water cooled, and the

<sup>\*</sup> Brief descriptions and ratings of all nine models appeared in Railway Locomotives and Cars, May, 1956, p. 61.



Cab control station on standard unit provides for operation with steam generator compartment leading.

cast iron pistons are oil cooled. Connecting rods are forged steel. The rods for each pair of cylinders are articulated—they operate in the same vertical plane and have a common crank pin.

The self-contained, hydraulic relay type engine governor will normally maintain constant engine speed within its fuel control range. This governor carries its own independent lubricating and hydraulic oil supply with an internal pressure pump and pressure storage accumulators. An overspeed governor is also provided to positively shut down the engine in case the speed exceeds a predetermined safe value. This is done by shutting off the combustion air and fuel oil supply. Combustion air for the engine is cleaned by means of oil-bath air filters.

Engine cooling water is circulated by a built-in centrifugal pump, gear driven from the engine crankshaft. Water is circulated through the radiator and lubricating oil cooler, and goes through the water headers on either side of the engine. Cylinder jackets are designed to give high-velocity cooling of the cylinder walls. Part of the water circulates through the supercharger and the air intercooler located between the superchargers and the air inlet manifold. This cooling of the inlet air lowers the mean temperature of the engine—reducing the heat load on the various engine parts. Water temperature is automatically controlled by varying the speed of the radiator fan through an eddy-current clutch. This holds down fan drive power requirements.

An electrically-driven pump transfers fuel from the tank to the injection pumps. It is fitted with a filter on the suction side and a filter and strainer on the discharge side. An injection pump of the individual impulse type is located in each cylinder head, with a short line to the fuel injection nozzle. The nozzle can be easily removed for inspection without disturbing fuel pump adjustments. Both pump and nozzle are enclosed to prevent dust and dirt from interfering with control rack operation. The high pressure fuel lines are interchangeable.

A gear-driven, positive-displacement lubricating oil

pump is mounted on the end of the engine. The oil, taken from the built-in sump tank in the engine sub-base, passes through the high-capacity, full-flow lubricating oil filter and through the water-cooled oil cooler. It then passes through a full-flow strainer to the main lube oil header in the engine.

The engine is started by using the main generator as a starting motor. A special winding on the generator draws power from the 32-cell lead-acid type locomotive storage battery.

Engineman's controls including a speed recorder are so located as to be at the right side when the locomotive is operated with the steam generator compartment leading. Normally, the locomotive is fitted with only the single control station. This can be changed to left side control, or multiple station control can be installed when necessary. Either single or multiple unit operation can be provided as required.

The superstructure is of welded construction throughout. Steel center sills, center plates, deck plates and bolsters are securely welded together to form the underframe. Center plates are equipped with renewable hardened steel wearing rings and liners, and provision is made for lubrication. Jacking pads and lifting lugs are built into the underframe.

Cast steel truck frames are used on the locomotive now in service, but fabricated steel frames are available. Steel tired wheels with locking rings may be substituted for the 40-in. rolled steel wheels. The locomotive can be built for operation on any track gage from  $56\frac{1}{2}$ -in. to 66-in.

The end frame construction is suitable for the application of various types of couplers and draw gear used in different parts of the world. It also permits modification of the coupler height as may be required.

#### Traction Equipment

A standard GT-581, railway-type traction generator is directly connected to the diesel engine. Power from the generator drives four GE-752 standard, axle-mounted, railway-type, d-c traction motors.

The generator is self-ventilated, and draws its fresh air from outside through the cab side louvers. A bulk-head is installed in the engine cab isolating the generator room and its air intake from the engine room. Normally, the generator ventilating air is discharged outside the cab.

#### Principal Locomotive Data

Wheel arrangement
Track gage
Coupler height above rail 34 in.
Length over end frames
Height over-all
Width over-all
Length between center plates 32 ft 6 in.
Truck wheel base 9 ft 4 in.
Minimum radius of curvature
Weight (fully loaded) 240,000 lb
Weight per driving axle
Fuel capacity
Lubricating oil
Engine cooling water
Sand

However, provision is made for recirculation of the air in cold weather to prevent ice formation on generator brush rigging.

The two GE-752 traction motors in each truck are ventilated by a mechanically-driven centrifugal blower. One of these blowers also pressurizes the control compartment to exclude dust and dirt.

The electric transmission is designed to give high utilization of engine horsepower throughout the operating speed range of the locomotive. The magnetic amplifier type excitation system consists entirely of static components. It is designed to provide the required generator output characteristic, and to automatically impose the necessary voltage, current and power limits. These limits all vary as a function of engine speed, simplifying multiple-unit operation because the train line between units needs carry only engine speed control signals. Maintenance is simplified—only one adjustment sets all three limits simultaneously. The control devices are arranged in functional groups and are readily removable for ease of maintenance. All components are so rated that they have reserve capacity, thus assuring longer life and reliability.

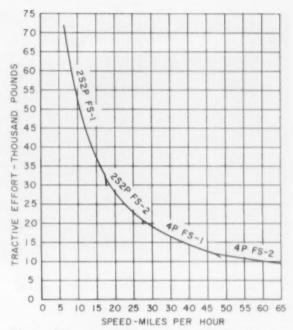
The static excitation system's inherent power limit prevents engine over-loading in event of governor maladjustment or any other condition which would make the engine produce beyond its rating. The governor load control function is then used in the conventional manner to reduce excitation and unload the engine.

The GE tapered dynamic braking system allows high armature currents for braking at low speed, but tapers the current off gradually at higher speeds. In conventional dynamic brake, the armature current is held at a constant value for each controller notch. By taking advantage of additional low speed motor capacity, the tapered brake allows braking efforts up to 25 per cent greater in the locomotive speed range where braking is most required. Excitation circuits automatically limit the amount of braking and prevent overloading the equipment. The engineman need not constantly manipulate the control handle as the locomotive speed varies.

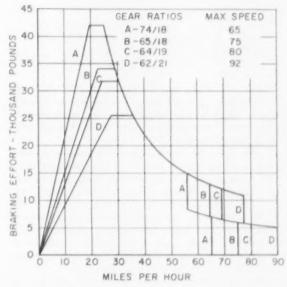
The locomotive has a 6SL air brake system. The two stage, three-cylinder, engine-driven compressor furnishes air for the locomotive and for train brakes. Two 55,000-cfm air reservoirs are located under the platform. Each of the eight truck-mounted brake cylinders operates fully equalized brake rigging on one driving wheel. Slack adjusters on the rigging compensate for shoe and wheel wear. A hand brake is also provided,

Brake equipment can be modified for operation with rolling stock equipped with vacuum brakes. Either the 6-SL-V type with a 3-cylinder expressor, or the 6-SL-AV1 type with a 6-cylinder expressor is available. Eight pneumatically-operated sanders are located to sand ahead of the leading wheels of each truck for either direction of motion. There are sight gages on both sides of the 800-gal, fuel tank so that fuel level can be read from either side of the locomotive. Steam generators in capacities from 1600 to 3750 lb per hr can be installed in the short cab at the front of the locomotive. If steam generator is not installed, this space may be used to provide additional fuel capacity of 800 gallons.

Different gear ratios can be applied to meet special service requirements. The locomotive may be ballasted up to a maximum weight of 260,000 lb.



Tractive effort curve is produced with two steps of field shunting in both series and parallel.



Tapered dynamic braking control yields high braking effort with any of four optional gear ratios.

#### Gearing Modifications

Gear Ratio	Maximum Speed MPH	Continuous Tractive Force LB				
74/18	65	53,000				
65/18	75	46,500				
64/19	80	43,400				
62/21	92	38,000				

A CORRECTION.—The article appearing on page 53 of the August issue is an abstract of a study prepared by the Timken Roller Bearing Company. The first study mentioned on page 53 was a presentation by Dr. O. J. Horger of Timken before the ASME in 1951.



Symptoms of potential diesel engine failures and their real causes are determined by shop inspections and simple laboratory tests, but

without spectrographic analysis on the Lehigh Valley. Maintenance problems can be analyzed without the use of costly equipment.

### Let's Be Logical About Diesel Maintenance

Charles P. Turner

System Supervisor Diesel Operation & Maintenance, Lehigh Valley Railroad

Development of the diesel engine paved the way for the first major postwar step in railroad modernization and increased efficiency—the replacement of steam locomotives with diesels.

As this radically different type of motive power came on the scene, an entirely new set of problems came with it. Mechanical officers were forced to develop completely new procedures. The maintenance problems and procedures were different not only because this was a new type of motive power for the railroads, but also because it was a new application for the diesel engine. On the railroad, unlike shipboard or powerhouse applications, mechanics are not always standing by to check gauges and make minor adjustments or inspections. As new methods were being developed, it was natural that the railroads' technical department should assist. In the course of analyzing the problems, laboratory men attempted to utilize the most modern scientific aids in predicting maintenance requirements to prevent part failures.

During the course of the last four or five years, the spectrograph and its latest refinement—the quantometer—along with the electron microscope have been used extensively in controlling diesel lube oil and fuel oil quality. By determining metallic contamination in the lube oil, excessive wear can be spotted before failures result. The success of these instruments has been well publicized.

The purpose is not to dispute claims made for this type of laboratory control or to detract from its useful-

ness. However, for the benefit of smaller roads like the Lehigh Valley, it should be pointed out that much can be accomplished by close cooperation between the mechanical and test departments. There can be scientific analysis of diesel maintenance problems without the use of expensive and complicated research equipment. Most significant about the use of spectrographs and other such instruments for diesel maintenance is the analytical approach. This is more important than its success in solving a particular problem. We believe that this type of thought can be used to great benefit on railroads-large or small, and with or without these newly developed instruments. Their use does not in itself prevent failures or decrease maintenance costs. For these instruments to be of any real benefit to a railroad, they must be accompanied by proper attitudes. Essential features are cooperation and an analytical approach to problems. Analytical approach means systematic assembly of all essential facts, and from these, a logical conclusion.

#### Spectrograph Limited

The spectrograph can indicate an abnormal amount of some metal in the lube oil of a particular engine, but nothing more. This is only one link in the chain. It remains for the mechanics actually performing the work on a particular engine to furnish the other essential information that might lead us to detect a malfunctioning part. Since diesel locomotives are assemblies of complicated machines, some worn and failed parts must be expected from time to time. In the process of wear, many symptoms are available which warn us of trouble before final failure occurs. It remains for the maintainer to recognize all symptoms and learn how to use them in diagnosing pending trouble. Many authors have indicated the value of used lube oil analysis as a diagnostic

tool. It is the author's feeling that this is only one of many possibilities.

When a metal part begins to wear, if the particles are small enough to be suspended in the lube oil or if metals go into solution by chemical action, it is possible to find them by analyzing the lube oil. However, parts do not always fail in such a manner. We have found that the obvious procedure of looking into crankcases, at certain parts, and into dirt traps and strainers pays dividends.

It has been our experience that the old elementary methods of visual inspection of crankcase, air box and top deck still have an important place in the maintenance program. We do not feel that they have been made obsolete by the spectrograph or electron microscope. Visual inspections of the air box and crankcase still disclose broken or worn rings, scored liners, defective injectors, and bearing difficulties. Full benefit of these visual inspections are not realized however, unless the full significance of the discovery is known. We must search for the "why" and not be satisfied only with having made the obvious and immediate repairs.

#### Monthly Test Important

In the exhaust-powered, turbo-charged, four-stroke cycle diesel engine a monthly blow-by test of each cylinder is of utmost importance. This test will disclose worn piston rings, worn valves or valve seats, and scored liners. Any of these parts, if allowed to continue to wear, will result in the loss of the power assembly. But it is more important to understand that with this type of engine the turbocharger, exhaust manifold and cylinder assemblies are related.

Malfunction of any one of these components directly affects the efficiency of the others and thereby the performance of the entire engine. A worn intake valve seat in one cylinder can seriously affect the combustion efficiency of all cylinders with resultant power loss. If valve seats are badly worn in this type engine, the effect would be noticed as low turbocharger pressure. All too often, maintainers using the "fix the immediate problem" approach, would simply change out the turbo of this engine. The analytical approach which we advocate requires that we first search for the basic cause of the trouble and correct this before repairing any resultant damage. In this case a blow-by test would have located the defective heads and made removal of the turbocharger unnecessary.

The spectrograph has successfully assisted in diesel maintenance, but a large portion of that success is the result of applying an analytical approach—weighing all the facts and drawing a logical conclusion. Spectrographic analysis is nothing more than a method of finding one more set of facts. In many cases the same conclusion could have been reached by reasoning from other facts which could be obtained without the spectrograph.

To illustrate utilization of cooperative analytical thinking and action, follow what was done after simple standard laboratory lubricating oil analysis determined that the oil in our locomotive 608 was contaminated with an excessive amount of carbonaceous material. One solution of this problem would be to change the oil and filters. However, after consultation between test and mechanical departments the unit was ordered to the shop to be checked. It is standard procedure on our road for

shop personnel to identify lube oil strainers and to examine them closely. In the course of this examination, they found small pieces of white metal. This could have been lead from a scratched bearing caused by the dirty lube oil, or it could have been aluminum from a piston in this particular engine. Standard methods of chemical analysis were used to determine that it was aluminum. Further inspection of this engine disclosed a failing piston. Had only the oil and filters been changed, this progressive defect would have continued to complete piston failure and unlimited engine damage.

One of the first steps in good diesel engine maintenance is the selection of the proper quality of fuel oil and lube oil and the establishment of proper controls to assure that both these products will reach the locomotive free of contaminants. Although the purchasing agent is responsible for the actual purchase, the selection of the proper quality is a joint venture of the supplier, and the technical and mechanical departments of the railroad. The supplier can only develop new or improved products if he has true performance data from the field. This is obtained from accurate wear measurements and part failure studies. This information is of value to the engine builder and must be considered in planning any preventive maintenance schedule.

The electron microscope has proved useful for fuel oil studies. Even without it there are many ways in which a railroad can do work in this field. It has been our experience that the rather simple and inexpensive method of fuel oil inspection suggested by Seniff and Plumbly in a paper presented to the St. Louis section of the SAE in 1950, can be adopted by any road with success. Our own epidemics of broken injector tips and plugged fuel filters were stopped by visual inspection of bottom samples from fuel oil shipments, and with the excellent cooperation of the supplier who eliminated the source of contamination. A major wear rate increase was prevented by the discovery that sulphur content of another supplier's fuel had increased to alarming proportions. Both of these problems were solved by using standard laboratory equipment and analytical thinking.

#### **Analytical Thinking**

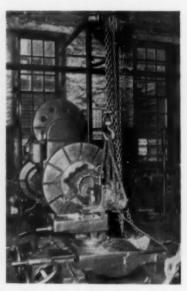
The present diesel maintenance program on the Lehigh Valley is the result of the type of thinking and planning which we choose to call analytical. We believe that the success of our program is highlighted by the fact that our schedule calls for diesel locomotives to receive maintenance on a once-a-month basis, while most roads bring their units to the shop at least twice a month. On road freight units we average 9000 miles per month. As an indication that this schedule is practical, it is noteworthy that with it, road failures have been reduced by 54 per cent. Certainly, part of this reduction is the result of more experienced operating and mechanical personnel. However, this large reduction would have been impossible even with increased experience if the maintenance program was not effective.

The approach which we call analytical is perhaps in reality the partial application of procedures described in "Operations Research for Railroads" (Railway Age, March 8, 1954, p 75). It is similar in that it requires teamwork for success, and different because its immediate application is to only one department.









A deposit of weld metal is laid on the crown of a passenger car or diesel roller bearing box (left) with the box under water to within an inch of where the welding is being done. The box is then bored out while holding it in the lathe in a special fixture (above center), It is finished to size by attaching a rotating grinder to the tool post holder (above right).

## Reclaiming Roller Bearing Boxes

An Eastern railroad reclaims both car and diesel roller bearing boxes by building up and refinishing the area in the crown where the principal wear occurs. The procedure begins with a thorough wire brush cleaning to prepare the interior surface for welding. The welding is done with the box partially submerged in water to carry away the heat and prevent distortion, to which the box is especially subject because only half the circumference is welded.

The welding operation takes place with the box resting on one end in a tank in which water can be conveniently admitted or drained. The level is brought to about an inch below the center and the weld started at the approximate center. The welding proceeds from this mid-point upwards with additional water run into the tank from time to time to keep the level approximately an inch below the section being welded.

When the first half is completed, the box is set on the other end, the water drained to an inch below the midpoint and the same procedure repeated, welding again from the center upward.

The thickness of the weld metal deposit is about  $^3/_{16}$  in. An E6013 coated rod is used with either ac or dc current, with a slight preference for dc. Two strips a little over

3 in, wide are deposited over slightly more that half the circumference. On the average, three passenger car boxs or two diesel boxes can be welded in an eight-hour shift.

The second step in the reclamation is to bore out the box to slightly undersize. This operation is performed on a conventional engine lathe for which a special fixture was built to secure the box to the head stock. Three cuts are taken. The first two are made with a tadium-tungsten tool at 50 rpm and .030 in. feed. The finishing cut is with a carbide tool at 75 rpm and the same feed.

The tadium-tungsten tool is used for the roughing cut because it is almost as hard as carbide but is more resistant to chipping which occurred when the carbide tool was tried on the intermittent cut. The machining time to complete the three cuts is about three hours on car and four hours on locomotive boxes.

When the machining operations are completed, the tool post is removed and a grinder put in its place in the holder. The box is revolved at 75 rpm by the lathe in the opposite direction to the rotation of the grinding wheel. Two passes—each taking about 40 minutes—are made through the entire length of the box to bring the bore to blueprint dimensions.

## Programs of Coordinated Mechanical Associations

#### Committee of the Coordinated Associations



J. L. Robson, Chairman (Great Northern)



C. F. Weil, Secretary

#### HOTEL SHERMAN, Chicago September 10, 11 and 12

Presidents' luncheon—Tuesday, September 11. Principal speaker: D. B. Jenks, president, CRI&P

Special tour: Electro-Motive Division (GMC) plant, plants of other Chicago industries, and of AAR Research Center— Tuesday afternoon, September 11.

Entertainment—Allied Railway Supply Association. No exhibits.

#### Air Brake Association

Monday, September 10

Address: President D. R. Collins, superintendent air brakes, Denver & Rio Grande Western.

Address: F. J. Steinberger, general purchasing agent, Atchison, Topeka & Santa Fe.

Value of Automatic Slack Adjusters on Freight Cars— Central Air Brake Club, F. G. La Master (chairman), air brake engineer and general road foreman engines, Chicago, Burlington & Quincy.

Improvements in Brake Control Through the Use of Modern Composition Brake Shoes—Westinghouse Air Brake Company.

#### 2 ----

Joint meeting with the Railway Fuel and Traveling Engineers Association, Subjects:

Freight-Train Handling, R. H. Francis, general road foreman equipment, St. Louis-San Francisco.

Causes, Effects, Remedies and Economic Disadvantages of Overcharge on Freight Trains—Manhattan Air Brake Club.

#### Tuesday, September 11 9 am

Report of Nominating Committee and election of Officers, Address: J. L. Robson, chief mechanical officer, Great Northern. L.W.E. Brake Equipment—New York Air Brake Company. Testing Diesel Locomotive Air Brake Equipment Daily, Monthly, Quarterly, Semi-Annually, 18 Months, 24 Months— Pittsburgh Air Brake Club.

Air Signal Equipment-Montreal Air Brake Club.

#### 2 pm

Influence That Locomotive Air-Brake Devices and Locomotive Air-Brake Equipment Arrangements Have on Charging Trains—St. Louis Air Brake Club.

Talgo Train Brakes—ACF Industries. Subjects for 1957 convention.

#### Wednesday, September 12 9 am

Joint meeting with Locomotive Maintenance Officers Association. Subject: Diesel Air Compressor Maintenance—W. C. Sipchen (chairman), superintendent air equipment, Chicago & North Western.

Question Box: Questions mailed to secretary or dropped into box for that purpose at the meeting to be discussed. Signatures or other identification not needed.

#### 2 pm

Completion of discussion on previous papers and questions. Report of Committees and introduction of new officers.

#### Car Department Officers' Association

#### Monday, September 10 10 am

Address by President J. F. Likarish, master car builder, Great Northern.

Report of Committee on wheel shop practices—E. N. Spencer, wheel shop foreman, Illinois Central.

Address by J. M. Budd, president, Great Northern.

#### 2 pm

Committee Report—Interchange and Billing for Car Repairs—L. L. Pierce, supervisor AAR Department, General American Transportation Corporation.

Committee Report—AAR Loading Rules—J. M. Hick, general car foreman, Great Northern.

Committee Report—Light Repair Tracks and Train Yard Operation—J. F. McMullen, superintendent car dept., Erie.

#### Tuesday, September 11 9 am

Committee Report—Maintenance and Upgrading Freight-Car Equipment—E. D. Fortune, car foreman, Atchison, Topeka & Santa Fe.

Addresses: R. R. Dooley, manager, Service Division, and J. B. Roberts, manager, service engineering, United States Gypsum Company.

Committee Report—Car Lubrication—W. J. O'Brien, general car foreman, New York, Chicago & St. Louis.

Comments by W. M. Keller, executive vice-chairman and director of research, Mechanical Division, AAR.

#### 2:30 pm

Committee Report-Maintenance and Servicing of Me-

chanically Equipped Refrigerator Cars—W. E. Seagraves, assistant supervisor diesel engines, Atchison, Topeka & Santa Fe.

Committee Report—Air Conditioning Equipment—Operation and Maintenance—R. E. Johnson, general electrical foreman, New York, Chicago & St. Louis.

#### Wednesday, September 12 9 am

Committee Report—Maintenance of Passenger-Car Equipment—W. E. Symons, assistant general mechanical superintendent, New York, New Haven & Hartford.

Committee Report—Painting—J. Gilmore, foreman painter, Norfolk & Western.

Miscellaneous reports. Election of officers.

#### Locomotive Maintenance Officers' Association

#### Monday, September 10 10:30 am

Report of Committee on Personnel Training.—J. W. Adams (chairman), manager of planning-production, Louisville & Nashville. Topic: Value of Visual Aid in Personnel Training.

Address by William M. Keller, executive vice-chairman and director of research, Mechanical Division, AAR. Subject: Certain Operational Characteristics of the Diesel Locomotive.

#### 2 pm

Committee Report—Diesel Engine Maintenance—M. B. Adams (chairman), general supervisor diesel equipment, Atchison, Topeka & Santa Fe. Topic: Progress Report on Extending Service Life of Pistons, Rings, Liners and Cylinder Heads.

Committee Report—Diesel Material Reconditioning and Control—J. J. Ekin, Jr. (chairman), superintendent of shops, Baltimore & Ohio, *Topic*: Economies of Diesel Material Reclamation.

#### Tuesday, September 11 9 am

Committee Report — Shop Equipment — R. H. Herman (chairman), engineer shops and equipment, Southern. Topic: Tools, Jigs and Testing Equipment.

Address by J. P. Morris, retired general manager—mechanical, Atchison, Topeka & Santa Fe.

#### Wednesday, September 12

Committee Report — Diesel Mechanical — O. L. Hope (chairman), mechanical superintendent, Missouri Pacific. Topic: Air Compressor and Gear Case Maintenance.

Report—Boiler Makers' Section—H. M. Schudlich (chairman), engineer water service, Northern Pacific. *Topic*: Diesel Water Treatment.

#### 2 pm

Committee Report—Diesel Electrical Maintenance—C. A. Beaver (chairman), general foreman, Bessemer & Lake Erie. Topic: Progress Report—Extending Service Life of Relays and Contactors.

Address: John A. Hall, director locomotive inspection, Bureau Safety and Service, Interstate Commerce Commission. Subject: Inspection for Safety First.

Committee Report—General Diesel Maintenance—C. L. Hall (chairman), director-diesel methods and procedures,

New York Central System. Topic: A Positive Electrical and Mechanical Diesel Maintenance Program.

#### Railway Fuel and Traveling Engineers Association

#### Monday, September 10 10 am

Address: President E. L. Reeves, trainmaster, Baltimore & Ohio Chicago Terminal.

Report of secretary.

Address: G. Murray Campbell, vice-president and executive representative, Baltimore & Ohio.

Safety-D. E. Mumford, director of safety, New York Central System.

Rough Handling-What's the Answer?-E. P. Olson, assistant to vice-president, St. Louis-San Francisco.

Education of Engine Crews on Proper Performance of Diesel Locomotive—W. R. Foster, trainmaster, Southern district, New York Central.

#### 2 pm

Joint meeting with Air Brake Association. Subjects: Freight-Train Handling—R. H. Francis, general road foreman equipment, St. Louis-San Francisco.

Causes, Effects, Remedies and Economic Disadvantages of Overcharge on Freight Trains—Manhattan Air Brake Club.

#### Tuesday, September 11 9 am

Panel discussion on Feasibility of Use of Economy Diesel Fuel—V. C. Barth, assistant engineer of tests, Chicago & North Western; W. King Simpson, technical director, fuels and lubricants, Electro-Motive Division, General Motors Corporation; L. S. Crane, mechanical research engineer, Southern; L. E. Talbot, chief chemist, Texas & Pacific.

Supervisory Responsibility for Rule Observance—V. E. Norton, assistant superintendent, Canadian National.

Gas Turbine-Electric Locomotive—W. R. Mitchell, Railway, Locomotive Sales Section, General Electric Company.

#### 2:30 pm

Address: Employee and Public Relations-R. G. Chestnut, assistant to vice-president organization, Canadian National.

Report: The Responsibility of operating personnel in Preventing Traffic Delays—L. H. Hale, vice-president and general manager Denver & Rio Grande Western.

Progress Report: Coal-Fired Gas-Turbine Locomotive— Peter R. Broadley, director of research, and W. N. Mayer, assistant to director, Locomotive Development Committee, Bituminous Coal Research, Inc.

Discussion: Steam Generators—Protection Against Frost, etc.—G. C. Scott, service assistant to vice-president—sales, Vapor Heating Corporation.

Education and Duties of the Road Foreman-Trainmaster— J. R. Weller, supervisor locomotive operation, Central Region, Baltimore & Ohio.

#### Wednesday, September 12 9 am

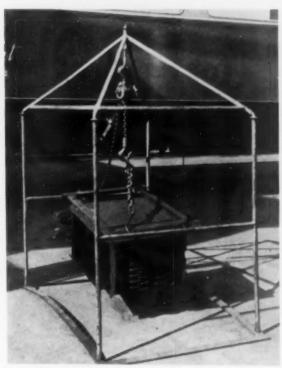
Panel discussion on Diesel Locomotives:—Representatives of Electro Motive Division, General Motors Corporation; Alco Products, Inc.; Fairbanks, Morse & Co.; Baldwin-Lima-Hamilton.

Standardization and Location of Equipment on Diesels.

#### 2 pm

Official business—Results of election, etc. Diesel Failures—Causes and Remedies.

## Ideas for the Car Repair Man...



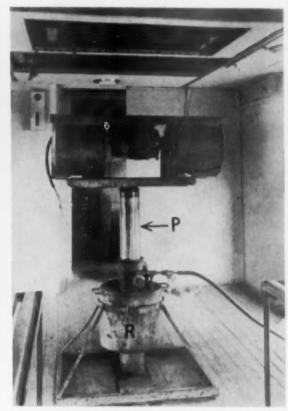
"Bird cage" hoisting device for applicator over passenger-car roof hatch for installing ac cooling coils

AIR-CONDITIONING HOISTS.—Two types of hoist are used for removing and reapplying over head coils and blower units in passenger-car air-conditioning equipment at the Southern Pacific general shops, Los Angeles, Cal.

The first, embodying a light tubular steel construction and appropriately called the "bird cage," is made to accommodate roof hatches of various size such as the 42-in. by 60-in. size illustrated.

The frame consists essentially of four parts: a base, two H-shaped ends, and a pyramid top, which may be easily separated and carried up the ladder to the car roof. The base frame, of ½-in. by 2-in. bar steel and arched to fit the roof around the hatch, is positioned by wiring to the hatch screws when necessary. The base frame carries at each corner a vertical pin which is a close fit in one leg of the H-shaped end. The pyramid top of the device is applied similarly to the upper part of the H-shaped ends and carries an 1-bolt to support a handratchet hoist. This provides a convenient means of lifting coils and blower units which have to be removed for inspection and cleaning generally at least once a year.

The second device is an air-operated, hydraulic jack used in lifting parts such as the blower unit, when they have to be applied from inside the car body rather than down through the roof. This operation, formerly done



Hydraulic jack which makes application of ac blower units from inside the car both safe and easy

largely by hand, was not only hard work but to some

The device consists of an oil and air reservoir R, 15 in. in diameter by 13 in. high, with choke fitting connection to a triple telescoping piston P which has a total lift of three times  $21\frac{1}{4}$  in. or  $63\frac{3}{4}$  in. The respective piston diameters are  $4\frac{3}{4}$  in.,  $3\frac{7}{8}$  in. and  $2\frac{7}{8}$  in., the smallest piston being fitted at the upper end with a small angle-iron, swivel-type frame to support the blower unit in a horizontal position.

Reservoir R is held in a vertical position by an angleiron base frame and contains the oil supply and air taken at 90 lb pressure from the shop air line. The height of this hydraulic jack in its lowered position is 32 in. and when fully raised,  $96\frac{1}{2}$  in., or more than enough to push the blower unit up into place safely and without any manual lifting.

IDENTIFYING CONTROLLED - CLEARANCE BEARINGS.—An eastern road has simplified the identification of controlled-clearance bearings by using a paint code. Stock bearings of three diameters maintained for

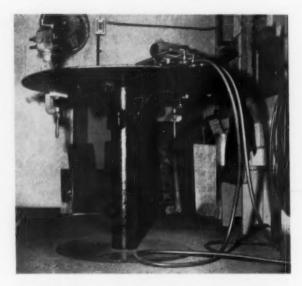
#### Ideas for the Car Repair Man...

each journal capacity are painted on the lug ends for rapid identification. The A-1 bearings are painted red; the A-3 bearings, painted white; and the lugs of A-5 bearings, yellow. Interchange Rules require that the actual internal diameter in inches be stamped on the top or on the lug, but the color coding speeds selection of the proper bearing and lessens the chance of applying a wrong size.

**REVOLVING WORK TABLE**—The illustration shows a revolving work table complete with brazing torch, a sheet metal cutter and a combination roll and elbow machine to turn the ends on sheet metal for joint flanges.

The table is adjacent to a stationary work bench. When the workman needs one of the tools with which the table is equipped, he merely turns the table to bring the tool to him.

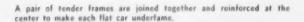
The table top is 3/8 in. thick and 48 in. diameter. To its center is welded a length of tubing which turns within a larger section of tubing. The top rests on four ball bearings and locks in any of four positions. It can also



be equipped with a setting-down elbow machine for flaring material.

FLAT CARS FROM TENDERS.—The Missouri Pacific has converted 20 10,000-gal steam tenders to flat cars 45 ft long with a capacity of 70 tons. The underframe of each car is made by joining together two 10,000-gal cast-steel tender underframes after backing the draft gear ends off. The resulting flat car frames are reinforced in the center by 12-in. channels, with a 1½-in. by 6-in. bar for a stiffener. The trucks are Andrews type with 6 by 11 boxes. The car decking is 2¾-in. oak. Light weight of the cars is 61,600 lb.

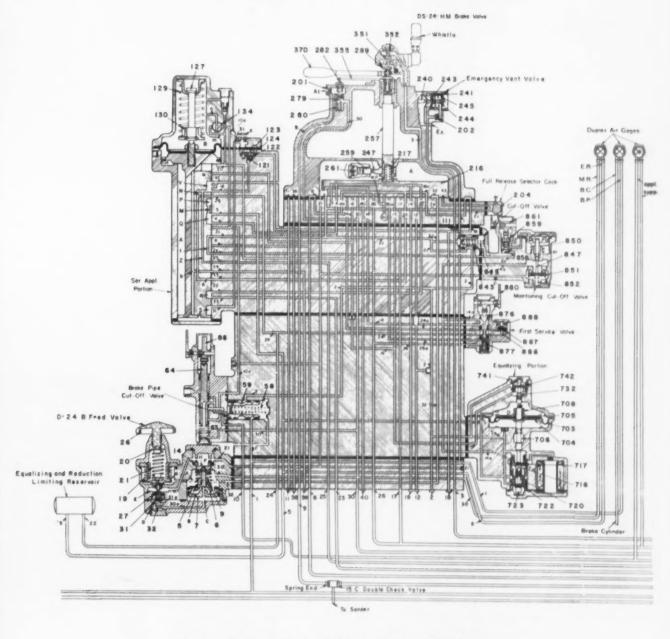
The conversion work was done at Palestine, Tex., at the rate of a car a week.





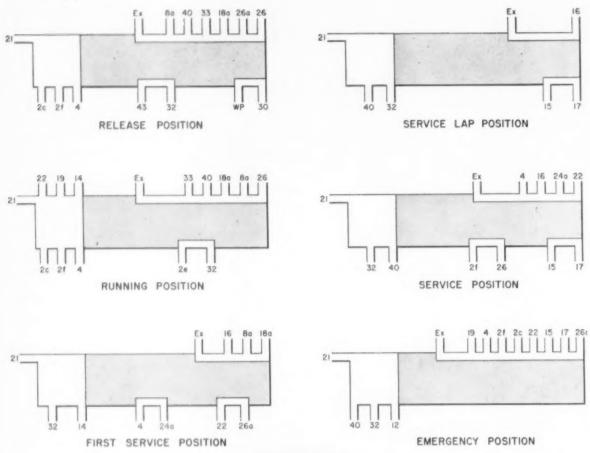


### 24-RL AUTOMATIC BRAKE VALVES



DS-24-HM BRAKE VALVE

#### DS-24-HM ROTARY VALVE POSITIONS



SKETCH 5

This third installment of the 24-RL brake series discusses the valve with the pressure maintaining feature and the valve incorporating electro-pneumatic control. It is expected that the next subject will be the AB freight-car brake. The popularity of this method of presenting air brake study has been demonstrated in the letters received. There have been some errors detected by our readers. In the preceding installment reference was made to "sketch 3" on line 4 of the second column of the last page. This should have read "balance of the brake valve must be colored as on the diagram for the DS-24-H brake valve." When such errors are discovered, it will be appreciated if they are brought to our attention. —Editor

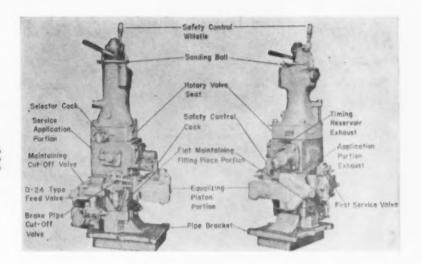
#### DS-24-HM Brake Valve

This brake valve is equipped with the pressure maintaining feature indicated by the letter M. In general, the same rules for coloring are applicable. Because this is an entirely new brake valve in which the construction is somewhat different, some new instructions are required.

Main Reservoir Connections: With a carmine pencil, color as follows: Starting in pipe bracket at connection 30, go to the first intersection and color the passage to the left into the feed valve and the one to the right which leads to the gage pipe which must also be colored. Coming back to the intersection, go up passage 30 to the next intersection which leads to the left into the hollow spring chamber of the brake pipe cut-off valve pilot valve piston. Color this spring chamber, going out through the choked opening into a passage which leads to the pressure end of floating piston 59. Returning to passage 30, go up into the service application portion where a left branch leads to the chamber beneath the piston head. Color the entire piston and slide valve chamber including the space between the slide valve and piston. Continuations of main passage 30 shows one branch blanked at the rotary valve and the other at the gasket.

Color passage 39 to the pipe connection in the bracket. In the service application portion, passage 30 continues upward. A left branch is blanked at the safety control cut-out cock, and the main passage continues through a choke into the spring chamber over the ser-

### DS-24-HMC BRAKE VALVE



vice application piston head diaphragm, A branch leads out of this chamber to the right, through the cut-out cock into passage 10a. Continue to color down passage 10a, taking in a short branch to the slide valve (blanked). Passage 10a continues around pilot valve piston into passage 10 to pipe connection 10 in the bracket. Color with Carmine dashes passage 25 and its connections, as well as passages 8 and 8a.

Feed Valve Connections Color with the orange pencil, feed valve pressure in passage 21 and its branches as on previous models, passage 19 to the bracket connection and passage 12 (in orange dashes) to the connection in bracket. Note that passages 21 and 14a are connected to the maintaining cut-off valve chambers above and below the cut-off valve. All must be colored in orange.

Brake Pipe Pressure With a yellow pencil color as follows: Branch of passage 2a to the spring end of the cut-off valve and another branch to the spring chamber under the maintaining cut-off pilot valve piston. The passage leading from the chamber above the maintaining cut-off valve piston and connected around the pilot valve piston to the atmosphere must be colored in yellow dashes. Passage 2 connects around the piston in brake pipe cut-off valve assembly (double heading cock) to passage and pipe connection 1. The balance of brake pipe passages can be colored as on previous brake valves equipped with the service application portion. In the Equalizing Portion, note that the equalizing discharge valve is a flat check type. The chamber above this valve as well as passage 2 leading to this chamber must be colored in solid yellow, and the chamber below the valve as well as passage 15 must be colored in yellow dashes. Passage 2b has a branch leading to the chamber above the maintaining valve and another branch to the spring chamber beneath check valve 722, all of which should be colored solid in yellow.

Equalizing Reservoir Pressure Equalizing reservoir pressure shown in light green must be indicated in the various passages similar to that of previous models, except for a branch of passage 5, which leads to the spring chamber above check valve 22.

Suppression Pressure In running position, the suppression passages 26, 26a, 15, and 17 must be colored in gray dashes.

#### DS-24-HM Rotary Valve Positions

Referring to Sketch 5, the rotary valve connections of this type brake valve can be shown in colors as follows:

Release Position, Sketch 5a. With an orange pencil color passage 21 and the entire block at the left end of the drawing, stopping where passages 2c, 2f, and 4 lead off. Color passages 2c and 2f in yellow, and passage 4 in light green. Color passages 43 and 32 and adjoining cavity in yellow. WP, passage 30, and connecting cavity should be colored carmine. The passages connected to Ex at the right upper corner can be left clear.

Running Position, Sketch 5b. With an orange pencil, color passage 21 and the block as in release position. However, passages 22, 19 and 14 must also be colored orange. Color passages 2f, 2c and 4 as in Release position. Passages 2e and 32 and connecting cavity are to be yellow. Passages connecting to Ex, uncolored.

First Service Position, Sketch 5c. Passages 21, 32, 14 and the entire left hand block to be colored in orange. Color in light green, passage 4 and connecting cavity, stopping at the point where passage 24a leads off. Color passage 24a in dark green. Passage 22 and connecting cavity to be colored in orange, stopping at the point where passage 26a begins. Color this passage in gray. Color in yellow, passage 16 and Ex including that section of connecting passage. Balance of passages, clear.

Service Lap Position, Sketch 5d. Color passages 21, 40, 32 and entire connecting block in orange. Color passage 15 and connecting cavity in yellow and passage 17 in gray. Passage 16 and Ex with connecting cavity should be colored in yellow.

Service position, Sketch 5e. Color passage 21 and connections same as lap position. Passage 2f and connecting cavity to be yellow and passage 26 in gray. Passage 15 and connecting cavity yellow and passage 17 in gray. Passage 4, in light green, passage 16 in yellow, passage 22 orange. As all these passages are connected to the exhaust, show dashes in light green, yellow and orange in the connecting cavity and exhaust passage

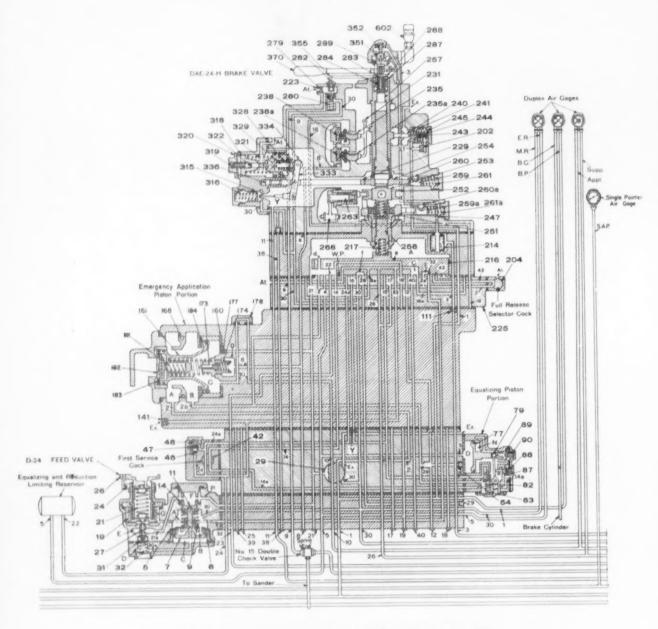
Emergency Position, Sketch 5f. Color in orange, passages 2l, 40, 32 and l2 and the entire block at the left. Passages 19 and 22 in orange, passage 4, in light green and passages 2f and 2c in yellow. Show dashes in Ex

connection as previously used. Passages 15, 17 and 26 are not colored.

#### DAE 24-H Brake Valve

This brake valve, as the letters indicate, is basic brake valve to which has been added the emergency application portion, electro-pneumatic brake portion and hinged handle. A safety control application will result in an emergency application of the brakes, with this type of brake valve. With the yellow pencil color chambers A, B and C in the application portion, also passages 2 and 2b. Continue with the yellow color into passage 10,

through the brake valve cut-out cock and into pipe 10 to the safety control system. Passage 3 to the deadman check valve at one end and to the pipe bracket and pipe 3 must be colored in yellow. Passage 8, starting at chamber D in the application portion, should be colored in yellow dashes. A branch from feed valve passage 21 is connected through a choke to chamber C of the application portion. Color in orange to the choke. With the brake valve handle in Lap position following a safety control application, feed valve air flows through the choke to build up sufficient pressure in chamber C (and with the aid of the spring) to move the piston back to normal position.



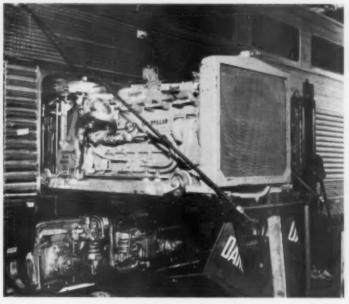
DAE-24-H BRAKE VALVE

#### ELECTRICAL SECTION . . . .





Above: A Santa Fe high-level diner with the louvred door swung open to show the location of the diesel-



electric power plant. At right: The Caterpillar engine-generator set is rolled out on rails for inspection or maintenance work.

### Power for the Self-Contained Car

Increased power requirements of new types of cars are met by floor-mounted diesel-electric power plants

THE SANTA FE CURRENTLY has in operation 49 Buddbuilt high-level cars employing diesel-electric power plants to supply electric ower. In addition to these, the Budd Company has constructed 14 full length dome cars for the Santa Fe and 6 for the Great Northern with this type of power plant.

In all these installations, the engine alternators are in equipment compartments located above the trucks. With this arrangement, the units are protected from the weather and are accessible for service while the cars are in motion.

The successful operation of two experimental highlevel coaches built in 1954 for the Santa Fe resulted in the purchase of the 47 additional high-level cars, again using the Caterpillar power plant. Three car types are included in this group of cars, and they make up five 9-car trains including coaches, lounge cars and diners. Improvements in radiator cooling, engine arrangement and roll-out features are embodied in these newer designs. The Caterpillar D-315, 40-kw engine alternators are used on the coaches, while the Caterpillar D-318, 60-kw engine alternators are applied to the sky lounges and diners.

#### Coaches

Each coach is equipped with one 40-kw, 80 per cent power factor, 220-volt, 3-phase, 60-cycle, self-regulated alternator, operating at 1,300-rpm and directly connected to a 60-hp, 350-cu. in. displacement, 4-cylinder, 4-cycle vertical valve-in-head type Caterpillar D-315 diesel engine. An oversize engine radiator is provided to assure adequate cooling of jacket water with outside ambient temperatures up to 125 deg F. The propeller fan for the radiator is mounted on the engine and driven

Information in this article was taken from the report of the Car Electrical Equipment Committee, Electrical Section, A.A.R., presented in Chicago, June 26-28, 1956.

by v-belts from engine crankshaft. This same drive operates the engine coolant centrifugal type circulating pump. A flyball mechanical type governor with an isochronous spring controls the engine speed within one per cent of the rated 1,300 rpm.

High engine water temperature and low lubricating oil pressure protective devices which shut down the engine in the event of either offense are employed. Combustion air is cleaned by means of an oil bath type of air cleaner mounted on the engine. Fuel and lubricating oils are adequately filtered and circulated by means of

gear type pumps.

Lubricating oil cooler is the water-cooled type. A thermostatically controlled steam heat exchanger mounted on one side of the engine block keeps the engine jacket water warm during layover periods to assure easy starting during cold weather even though anti-freeze solution is used for coolant. A 32-volt d-c electric motor geared to the flywheel is used for starting the engine. Pressure and temperature gages for fuel, lubricating oil and jacket coolant are provided in addition to an hour meter to indicate engine usage.

The self-regulating characteristic of the alternator is effected by means of a saturated rotating field from an externally mounted belt-driven exciter. This, combined with the narrow air gap and specially designed magnetic circuit, provides satisfactory voltage regulation without the use of a static regulator. The stability of the engine in absorbing loads plus the high kva margin above normal rating of the alternator permits across-the-line starting of heavy motor loads without lamp flicker.

#### **Engine Alternator Compartment**

The engine alternator is located above the truck at one end of the car and is resiliently mounted on a roll-out cradle which rests on tracks attached to the car structure. Removable extensions of these tracks are suspended from the side frame of the car for easy roll-out of the unit through a hinged door. This is necessary only for major engine maintenance or removal of the complete unit. Flexible fuel, water and steam lines and electrical plugs for control and power circuits are easily

disconnected to expedite removal. Adequate lighting for normal service with the engine in the stowed position is provided.

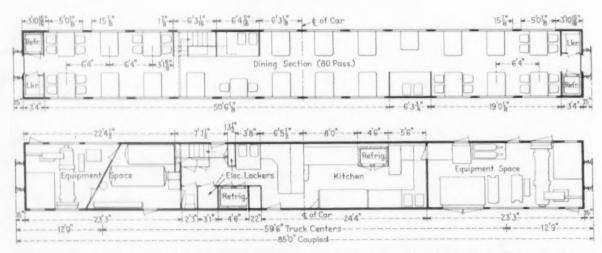
Air for engine radiator cooling is drawn into the compartment through filtered openings in one side of the car. This air passes over the alternator and engine and is then discharged through the radiator and a louvered door opening on the opposite side of the car. An automatic carbon dioxide fire protection system in keeping with the recommendations of the National Fire Protection Association floods the engine compartment and shuts down the engine in the event of fire. Push buttons for normal starting and stopping the engine and an alternator frequency meter are provided. The engine can be started only from this compartment, but it can be stopped from a remote station inside the car body. Hinged access doors in the car side and engine room transverse bulkhead permit access to the engine compartment from inside and outside the car.

#### Power Circuits and Battery Charging

Electrical energy from the alternator is transmitted to the electric locker inside the car where it is distributed to the various energy consuming pieces of car equipment through a motorized circuit breaker. An additional motorized circuit breaker is connected to 220-volt a-c receptacles on the sides of the car and provides the energy for operating car equipment from wayside power when the diesel alternator is shut down.

The use of motorized circuit breakers provides a simple effective operating and protective system of control and was selected in lieu of a transfer contactor because of the infrequent requirement of engine startings in any given period of time. Further, a saving in space and weight is effected by having one piece of equipment provide the function of two.

The circuit breakers are actually control panels with suitable interlocks and other required controls. Each breaker is operated from a remote position by a push button which operates a motor to close the breaker. Another push button will open the breaker or, if necessary, reset it. A pilot light on each pushbutton box indicates



Floor plan of high-level diner. Total weight of 208,600 lb required that these high-level diners be equipped with six-wheel trucks. Cars are standard AAR 85-ft length, have Budd's stainless steel structure; overall height is 15 ft 66½ in.





Upper left: Stainless steel kitchen, equipped by Angelo Colonna, is on the lower level of the diner,—has ranges, broilers, ovens, refrigerators.

Upper right: There are two electrically operated "Subveyor" assemblies on each diner which move meals from the kitchen to dining room on the upper level, and also return soiled dishes.



At right: With kitchen, auxiliary equipment and controls all on the lower level, it is possible to feed 80 passengers at a single seating, in this spacious, attractively furnished dining room.

when the breaker is closed. An under-voltage trip coil causes the circuit breaker to disconnect the load from the line in the event of a power failure. The alternator operates a time-delay relay to assure full voltage on the line before the 150-amp alternator breaker can be operated. Interlocks are provided to prevent the standby motorized breaker from being operated at the same time the alternator breaker is closed to prevent paralleling the alternator with yard service.

Standby service is obtained from two 100-amp, 250-volt receptacles on each side of the car. Both receptacles on one side of the car must be plugged in before power can be transmitted to the standby breaker. A reverse phase relay located in the electric locker prevents incorrect phasing.

The motorized circuit breaker without a thermal element is used to connect yard service to the car. Protection in this circuit is obtained from the yard service. This circuit breaker is likewise interlocked with the alternator breaker to prevent simultaneous operation.

A manually operated 150-amp trainline circuit breaker

of conventional type permits feeding power to or receiving power from an adjacent car. It is possible to transmit enough power in the winter time to operate four cars from one engine alternator, if necessary. The trainline circuit breaker also has an interlock which prevents the standby circuit breaker from being energized at the same time and another interlock which drops out the modulating control relays for the cooling system, thereby shutting down one-half of each evaporator coil freon supply, one compressor, and two condenser fans in the event of an engine failure. This automatically arranges for partial cooling in two cars that are trainlined when additional load trimming is required.

The alternator or standby power source supplies energy to a 25-amp selenium rectifier which charges the battery for engine starting current and the d-c circuits in the car.

The lighting load is handled by three 2-kva transformers with a total connected load of 4.5-kw. The balance of the load in the car is mostly air conditioning. An approximate division of the load under several operating conditions is included in the report.

#### Sky Lounges

Each sky lounge is equipped with one 60-kw, 80 per cent power factor, 220-volt, 3-phase, 60-cycle, self-regulated alternator operating at 1,800 rpm and directly connected to a 92-hp, 525-cu. in displacement, 6-cylinder, 4-cycle vertical valve-in-head type Caterpillar D-318 diesel engine. The descriptive details of this engine alternator are generally the same as those of the D-315 unit, except that for field saturation it uses a static regulator to hold back the exciter output to prevent the line voltage from increasing as the load decreases.

#### Diners

On the dining cars, the all-electric kitchen, in addition to a heavy air conditioning load, requires two 60-kw, 220-volt, 3-phase, 60-cycle self-regulated alternators, both running at 1,800 rpm and each connected to a 92-hp, 6-cylinder, 4-cycle diesel engine. The alternators, which are located in two separate compartments, one on each end of the car, are paralleled and synchronoscopes are provided in each ending compartment to aid in bringing the alternators on the line in phase.

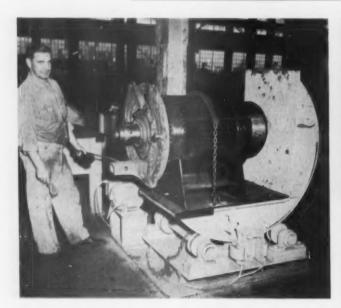
Each compartment is provided with the features de-

#### On the diner: Load in kilowatts under different conditions.

	SUMMER	WINTER	ONE ENGINE OPERATION	STANDBY SERVICE
A-c Light	4.3	. 4.3	4.3	4.3
Misc.			1.4	
Blowers			6.4	
Air Conditioning			14.2	
Refrigeration .	3.2	3.2.	3.2	. 3.2
Kit. Appliances		. 10.1.	10.1	. 10.1
Range Tops .	20.0.	. 20.0.	15.0	141
Range Ovens .			6.0	
Broiler	6.0	6.0.		
Totals .	85.0	. 60.4	60.6.	50.0

scribed for the coaches. In addition a panel on which are mounted a synchronoscope frequency meter, pilot lights and push buttons for operation of the alternator motorized circuit breakers, is located adjacent to the engine.

The control features of each alternator are essentially the same as on the coach and sky lounge cars, with some added controls. There is an increase in load on this car over the other two, attributable to the use of electric cooking and food refrigeration. The range and broiler consume 35 kw alone.



#### **Up-Ender Turns Armatures**

THE UP-ENDER shown in the illustrations is a type used in a number of shops for turning motor frames from a horizontal to a vertical position, or conversely. In the Glenwood, Pa. shops of the Baltimore and Ohio, it has been adapted to the turning of armatures, as well. This is accomplished by placing a cradle on the up-ender. The cradle is secured to one of the bed plates by flanges which slide over the edges of the plate.

With the cradle in place, an armature is picked up in



At Left: Cradle and chain make frame up-ender suitable for turning armatures.

Above: Armature in vertical position about to be picked up by crane hook.

a horizontal position on belts and secured by means of a chain fitted with a length of hose to protect the armature. It may then be turned to the vertical position, and picked up from a clevis screwed to the pinion nut threads. The arrangement may, of course, be used for the reverse operation.

### Freight Train Performance Analyser

A quick way to find answers to such questions as what kind of a locomotive is needed to move a train of - tons over your ruling grade?

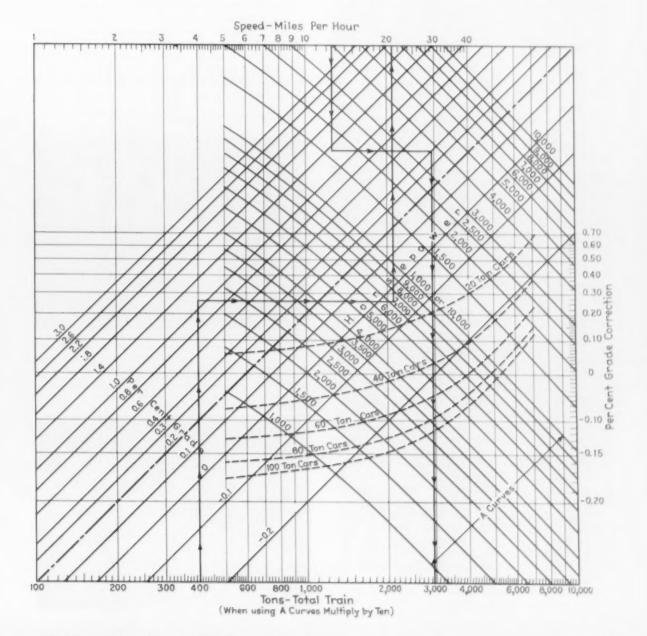
The Accompanying Chart shows the relationship of the four major factors involved in the analysis of a freight train movement: (a) balanced speed; (b) locomotive horsepower; (c) per cent grade, and (d) total tonnage of the train. It will solve problems having to do

By E. A. Foster

with practically any size of operation, with any of the above four mentioned conditions varying to any limits normally encountered.

Since the Curve has to be based on a constant train

Mr. E. A. Foster is locomotive Performance Consultant, of Fairbanks, Morse & Company.



resistance value, the writer arbitrarily chose the relatively average figure of 6 lb per ton for the train resistance. On grades of lesser per cent, say 0.2-0.4, the value chosen for train resistance is important since, if not reasonably correct, it will produce an answer in considerable error. Because of this, the fifth factor has been added and has been expressed as "Per Cent Grade Correction", the ordinate along the right side, and speed—"Miles per Hour"—as the other, at the top of the sheet, and applying to the five curves entitled "20, 40, 60 and 80-ton cars". The correct use of these curves is described in the following text.

In order to be familiar with the analyser two problems have been set forth, the heavy lines with arrows showing the procedure in arriving at an answer. The first problem deals with handling a 4,000-ton train (total weight) with 3 locomotive units, having a combined horsepower of 7,200 and operating over a 1.1 per cent grade. Question: What will be the balanced speed of a train under these conditions? Experience will teach one, that when dealing with heavier trains, that the A curves for horsepower values should be used. Under such circumstances, the tonnage values shown on the scale at the bottom of the sheet should be multiplied by 10. Thus, 4,000 tons will be found at the position indicated as 400 (400 imes10). From this point, move vertically to the ruling grade which is at a spot somewhere midway between 1.0 per cent and 1.2 per cent grade lines. From this location, move horizontally to the right slightly beyond the 7,000hp curve and interpolate for 7,200 hp. Now move vertically to the top scale, indicating that the speed of the train will be 21 mph.

To see if proper train resistance has been taken into account, move vertically downward from 21 mph, and holding that position, move horizontally to the left from O per cent grade correction, and one will find that train resistance is correct for freight cars weighing approximately 38 tons each. In the event the average weight of cars of the train was 80 tons, one should move vertically downward from 21 mph to the intersection with the curve representing 80-ton cars. From this location, move horizontally to the right and observe the per cent grade correction is 0.12. Therefore, the problem should be solved with compensated grade of 1.10 per cent minus 0.12 per cent which equals 0.98 per cent. Again proceed to solve the problem as it was done before. Move vertically from the 4,000-ton values and now stop at the value of 0.98 per cent which is an interpolate value between 0.9 per cent and 1.0 per cent grade lines. From this position, move horizontally to the right to the interpolated horsepower value of 7,200, and from this position move vertically to find a balanced speed of 23.5 mph. To check the train resistance value used, move horizontally downward from 23.5 mph to the 80-ton car line and hence horizontally to the Per Cent Grade Correction. We now find that this value has changed, i.e., not more than 0.01 per cent grade correction.

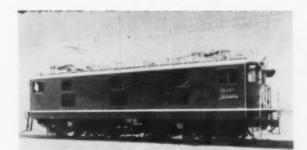
The second problem selected requires that we determine what tonnage can be handled at a balanced speed of 12.5 mph on a 0.4 per cent grade, with 30-ton cars and a 1,600-hp locomotive. Begin at the top of the sheet at 12.5 mph, and move horizontally downward to an interpolated 30-ton cars, and from this location move horizontally to the right and note that no per cent grade correction is required. Returning to the 12.5 mph scale,

move vertically downward to the interpolated 1,600-hp value and from this location move horizontally to the right to the 0.4 per cent grade and from this location, move vertically downward, and observe that the total tonnage of the train will be 2,960. It should be cautioned that in using this chart the locomotive weight must be subtracted from the total tonnage to give the trailing ton or tonnage rating. These curves are based on rated horsepower input to the main generators for traction purposes which is the normal rating given by the builders of diesel locomotives in the United States for domestic service including Canada and Mexico. It is interesting to note that regardless of prime mover, i. e., diesel, steam turbine, gas turbine or atomic source of powerso long as electric transmission is used, employing generators electrically attached to traction motors, the analyser is reasonably correct. This is true for all types of electric power having generators connected to 2, 3, 4, 6 or 8 traction motors. At the lower speeds, roughly 10 to 12 mph, the lower efficiencies of electric transmissions have been taken into account. At the higher speeds, the efficiency is assumed at the more or less standard of 82 per cent to 84 per cent. At speeds in excess of 30-40 mph the increase of locomotive or head end resistance throws the analyser into error.



BATTERY SHIPPING CONTAINER. Shipping container developed by the Florida East Coast for shipment of batteries to and from the road's battery shop at St. Augustine and between other terminals is designed to be handled with a fork lift truck. Lid is not shown. Below: Adjustable spacers in this container make it possible to clamp batteries of varying dimensions. Spacers are located to compensate for variations in width and depth of the battery so all types can be handled in shipment without damage.





A series a-c commutating type locomotive used for experiments.

Experimental train in operation on the 19-mile electrified section of the Senzan Line at right.

## Japan Adopts 60-Cycle Electrification

Plans have been consummated to electrify 2,005 miles of the Japanese National Railways, 80 per cent of this mileage to use a 60-cycle, 20,000-volt overhead contact system. The remaining 20 per cent will consist of extensions of the existing 1,500-volt d-c system. An addition of 3,100 miles of a-c electrification is contemplated and when this is completed, half of the JNR lines will be electrified. The 20,000-volt contact system was chosen because this is the maximum voltage which may be used with the available clearances. Installations of electrification at commercial frequencies in France, Belgian Congo and England use 50-cycle power. Sixty cycles will be used in Japan.

It is estimated that the a-c system will effect a saving of 35 per cent in capital cost, that a-c locomotives of the same weight as the d-c now in service will have 30 per cent more tractive force, that the a-c electrification can be used in both the 50- and 60-cycle areas in Japan, and that the change will make electrification practicable for some of the lighter traffic lines.

The decision to adopt the 60-cycle, a-c electrification was based on experiments made on a 19-mile line with two types of locomotives—one having a-c motors and the other using mercury-arc rectifiers and d-c motors. The latter type was selected. Sixty six-ton, narrow-gage rectifier type locomotives operating from a 20,000-volt line develop 2,000 hp. The gage of the JNR is 3 ft 6 in.

The spacing between substations will be about 31 miles. Substations will be equipped with Scott-connected transformers to reduce unbalancing of the power network. The standard height of the contact wire is 17 ft. In tunnels this may be reduced to 14 ft 7 in.

The overhead contact system consists for the most part of inclined catenary with a 55 mm² messenger and a 110 mm² grooved copper contact wire. Concrete poles with flexible brackets are used to support the contact system. In locations where the d-c and a-c systems meet, switching arrangements provide for applying either a-c or d-c power to adjoining sections of the overhead.



#### Characteristics of 60-Cycle Rectifier Locomotive

Wheel arrangement	BB
Total weight	66 tons
Overall length between coupling faces	
Maximum width	9 ft 2 in.
Height of locomotive above rail	
(pantograph down)	13 ft 6 in.
Rigid wheel base	7 ft 10 in.
Distance between center plates	20 ft
Diameter of driving wheel	44 in.
Power system	
Rating (continuous full field)	2,000 hp
Tractive force (continuous)	32,400 lb
Speed (full field)	
Maximum operation speed	
Gear ratio	16:91 = 1:5.69
Ignitron system	
Controlling system	Tap change, transforme secondary



Main building of the Pennsylvania's Hollidaysburg, Pa., car shop, 182 ft by 2,760 ft, is lighted to 35 footcandles, with 96-in. slimling fluorescent lamps.



#### Tach Generator Magnetism

A Means of determining if the magnets of tachometer generators have weakened to the point at which they should be replaced has been established at the Baltimore & Ohio Glenwood, Pa., shops. The equipment used is shown in the illustration.

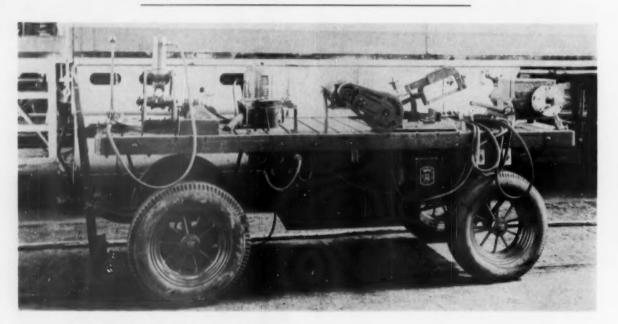
The armature under test is mounted on the panel at the right. Above the armature is a soft iron bar, pivoted at the panel at the left, and connected to the plunger of a solenoid at the right.

Each of the six magnets in the tachometer armature are rotated under the bar in turn, and in each position current in the coil is increased until the magnetic pull between the magnet and the bar is broken.

If the break-away current is less than a predetermined amount, the tachometer armature is replaced. Current values have been determined by observing the operation of generators in service and minimum values of test current established.

Current for testing is supplied by a power pack with Variac control, and is measured by a milliammeter connected in series with the solenoid.

Break-away current required to make the solenoid lift the bar of the armature determines if the magnets are still serviceable.



#### Portable Work Bench for Electricians

THE SANTA FE NOW HAS in use at its diesel shop at San Bernardino, Cal., two portable work benches for electricians, (one is shown above), in making heavy electric rewiring and servicing repairs on diesel locomotives. They save many steps and much time for the men.

The work bench is a converted baggage truck with rubber-tired wheels provided with the following equipment (left to right): hydraulic conduit-bending device with hand pump and necessary dies; a carbon table or electric soldering jig for applying connectors and lugs to heavy cable (a transformer supplies heavy current values required to heat the carbon); small motor-operated hacksaw; Beaver model C pipe-threading and cutting machine; pipe vise; and tool box underneath the truck.

#### EQUALIZE BRAKE FORCES...



### BRAKE BALANCERS

### Eliminate truck distortion . . Greatly reduce maintenance . .

Development of the Wine Brake Balancer has proved the solution to unbalanced braking forces that develop with the conventional truck brake arrangement.

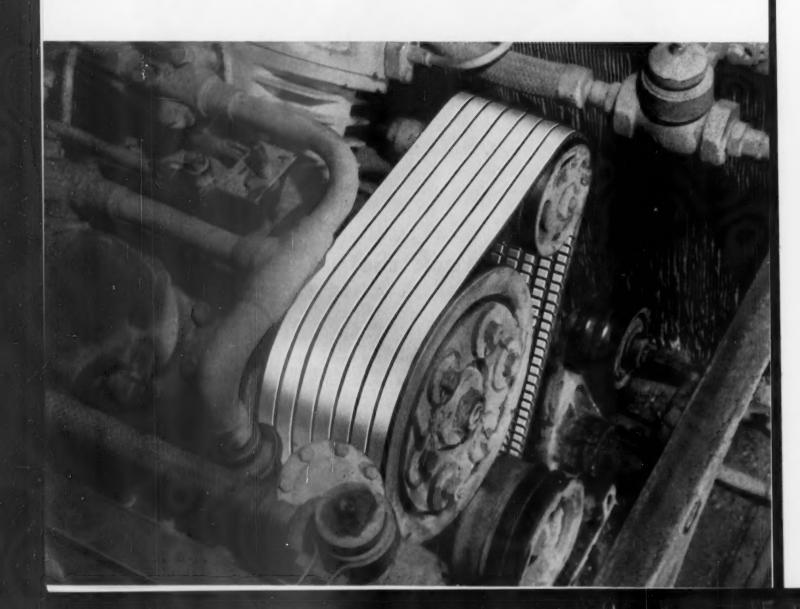
The Wine Brake Balancer replaces the standard dead lever connector and eliminates the necessity of the dead lever connector bracket on the truck bolster

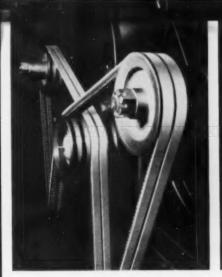
Instead, the Wine Brake Balancer has brackets secured to the center sill flange at each end of the car, and connectors extend from these brackets to the dead levers on the truck. This arrangement "balances" the brake forces by returning them to the underframe of the car This simple, yet rugged design meets all service requirements on any capacity car Write for complete details

THE WINE RAILWAY APPLIANCE CO., TOLEDO 9, OHIO

Dayton Cog V-Belts are ruggedly built of special materials processed to withstand the punishment of tougher railway service.

## Major railroad cuts drive costs in half with







Dayton Endless Cog-Belts provide tremendous gripping power, have great tensile strength, amazing flexibility lengthwise and are heat and oil resistant.

### Dayton Endless Cog-Belts\*

Seaboard Airline reduces diesel and air conditioning drive replacement costs 50% by switching to Dayton Endless Cogs.

It all started when the Seaboard Airline Railroad called in Dayton Field Engineers to find a means of improving drive performance. A change-over to Dayton Endless Cog-Belts—stronger by over 40% than standard V-Belts—was recommended and the change was made.

Belt failures became few and far between . . . the need for maintenance and service dwindled to an all-time low . . . savings in time and labor grew to important amounts . . . replacement V-Belt costs dropped to half of that expended in previous years when other drives were used.

Now Seaboard Airline uses Dayton V-Belts and Cog-Belts exclusively for all diesel and airconditioning drives as well as for all special applications.

Savings like these, experienced by almost every railroad in the country (Dayton V-Belts are original equipment on over 90% of all types of diesels) are available to your railroad, too. Why not write Dayton Rubber Co., Railway Division, Dayton 1 Ohio, and learn how you can improve performance, lower costs with Dayton V-Belts for every drive requirement.

#### Other major users of Dayton Railway Endless Cog-Belts\*

Baltimore & Ohio Central of New Jersey Chesapeake & Ohio Illinois Central Milwaukee Road Missouri-Pacific

New Haven New York Central Pennsylvania

Santa Fe Southern Pacific Union Pacific

@D. R. 1956



\*T. M.



### PROBLEM PAGE . . .



#### WHERE THE TOUGH ONES ARE HANDLED

#### DO DIESELS START FIRES?

Can the responsibility for track-side fires ever be laid to diesel-electric locomotives?

(Discussion continued from the August issue)

MICHIGAN'S SOLUTION, by D. F. Weir, supervisor, Michigan Railroad Fire Prevention. Since the introduction of diesel locomotives on Michigan railroads, many forest fires have been traced directly to engine ejection of ignited carbon deposits. Until 1950 a very small percentage of the locomotives operating in Michigan and many other states were the diesel type. That year marked the start of a rapid changeover from steam to diesel power. However, with this rapid increase in the number of diesel engines in many states, the number of forest fires also has increased.

The rise in the number of these fires was particularly noticeable in the Great Lakes states during the 1952 and 1953 forest fire seasons. Michigan reported 65 per cent of its railroad-caused fires in 1953 were of diesel locomotive origin. Wisconsin and Minnesota reports showed approximately the same percentage. Several other states have advised that the diesel engine has presented their fire control agencies with a new headache.

What is being done to find a solution to the problem? Aware of the fact that the diesel might cause many right-of-way fires, the Forest Fire Section of the Michigan Conservation Department's Field Administration Division began experimenting with spark arresting devices for diesel locomotive exhaust chambers several years ago. Conservation forest fire officials called a special conference in the spring of 1953. Present were representatives of locomotive-building companies, railroads operating diesels in Michigan, and state and federal forest fire control agencies in the Great Lakes states. Out of the conference came conclusions as to the cause of diesel engine fires.

The fire-setting potential of a diesel is definitely linked with the type of the train service required of the locomotive. An analysis of Conservation Department forest fire records showed that diesels on passenger and fast freight runs seldom set fires. Blazes reported were usually set by locomotives in local freight and switching services. The type of diesel engine used in the latter service often idles for long periods causing a buildup of carbon deposits in the exhaust chamber. When the engine is laboring hard the rapid rise in the temperature of the exhaust chamber tends to ignite and loosen the carbon.

Railroad companies have been as cooperative in the designing, making, and testing of devices for diesel fire prevention as they were in the past in experimenting with devices to prevent steam engine exhaust fires.

Changes were made in the arrangement of the baffle or deflecting plates in the exhaust of their diesel engines. Several types of screened hoods for the exhaust stacks were made and tested. The spark arresting device finally approved looked most promising to forest firemen, for diesels so equipped and operated the last half of 1953 set no fires.

The next step will be to have our railroad companies equip the hundreds of diesel locomotive units now in service with this arrestor or a suitable equivalent if one should be developed.

There is every indication that this will be done. The railroads do not want these fires because they are costly in several ways. They are required to reimburse the state for the cost of suppressing such fires and to pay for the damages to state lands and property. Too, unattended railroad-caused fires that spread from the right-of-way to adjacent forested lands do not build good will towards the offender. (Reprinted by permission from Michigan Conservation, May-June 1954, p. 20).



Courtesy Michigan Department of Conservation.





### **QUESTIONS and ANSWERS**

#### 6-SL Brake Equipment

This is a new series of Questions and Answers pertaining to the 6-SL air brake equipment for switching locomotives. The references to the pamphlet, page and part numbers in the text indicates where the original material may be found in the manufacturer's technical publications and instruction pamphlets. Authorized persons may obtain a copy of Instruction Pamphlet Number 5046-15 which deals with this equipment by applying to the nearest district office of the Westinghouse Air Brake Company.

W159-Q-During the operation Service Application what must be done when pressure in chamber D (as shown on equalizing reservoir gage) is reduced the desired

A—The handle is moved to LAP position, thus stopping any further reduction in chamber D.

W160-Q-Does the flow of brake pipe air to atmosphere

cease at once?

A.—Whether the flow of air from the brake pipe ceases at once or continues for a period of time after the handle is placed in LAP position depends on the length of the train.

W161-Q-Describe the action with a short train.

A-With a short train, the total volume of air in the brake pipe is not very great. It escapes through the service exhaust nearly as fast as the air in chamber D is flowing out through preliminary exhaust port e.

W162-Q-How does this affect the relation of pressures above and below the equalizing piston?

A In this case, as soon as the pressure in chamber D ceases to fall, brake pipe pressure below the piston becomes slightly less than that above.

W163-Q-What then takes place?

A-The higher pressure moves the piston downward. scating the equalizing discharge valve and cutting off further exhaust of brake pipe air.

W164-Q-What is the action on a long train?

A—On a long train the total volume of air in the brake pipe is large. It takes longer for enough air to escape through the service exhaust fitting to reduce the pressure. The pressure below the piston falls at a slower rate than that above it.

W165-Q-What is the result?

A-Air continues to escape from the brake pipe after the handle has been placed in LAP position until brake pipe pressure has been reduced slightly below that in chamber D. Then the piston is moved downward and service exhaust opening is closed.

Pamphlet 5046-15-Page 38

W166-Q-Why is the flow of air from brake pipe to atmosphere not controlled directly by movement of the brake valve handle?

A-The equalizing piston and equalizing discharge valve automatically measure the amount of air which must be discharged from the brake pipe in order to obtain the desired reduction and govern the rate of its discharge, according to the length of the train.

W167-Q—What advantage is gained by slow closing off of brake pipe reduction as the pressure falls?

A-Prevents a surge of air to the head end of the brake pipe.

W168-O-What may be the affect of such a surge of air? A-It may cause some of the head brakes to release.

W169-Q-What is the initial operation at the distributing valve when a reduction of brake pipe pressure takes place?

A—Since the brake pipe is connected to chamber P on the brake pipe side of equalizing piston 26, pressure in that chamber is being reduced below that on the opposite side (auxiliary reservoir) resulting in movement of piston to the right.

W170-Q-What does first movement of piston accomplish? A-Closes feed groove v, and at the same time moves graduating valve 28 until it uncovers the upper end of port z in equalizing slide valve 31.

W171-Q-Describe the action as the piston continues its

A-The shoulder on the end of piston stem engages the slide valve which is also moved to the right until the piston strikes graduating stem 44 of the cylinder cap which prevents further movement.

W172-Q-What ports are now connected?

A-Port z in the slide valve then registers with port h in the seat, and cavity n in the slide valve connects ports h and w in the seat.

W173-Q-What flow of air results from above connections? A-Since the equalizing slide valve chamber is always in communication with the pressure chamber, air can now flow from the latter to both application cylinder g and application chamber.

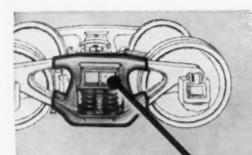
W174-Q—What takes place as pressure builds up in cham-ber g on the left of the application piston? A—The piston and attached exhaust slide valve 16 are

moved to the right cutting off ehaust ports d and e from slide valve chamber b.

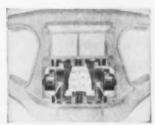
W175-Q-What happens further?

A-As the piston continues its movement, the end of its stem contacts application pilot valve 71, moving it from its seat and allowing main reservoir air in chamber al to flow to slide valve chamber b and thence through passage c to the brake cylinder pipe.

W176-O-What action takes place with pilot valve unseated? A-With the pilot valve unseated, pressure is reduced in chamber al faster than it can be restored from main reservoir through choke a2; therefore application valve 68 approaches a balanced condition in which it is unseated by a slight excess of application cylinder pressure over that of the brake cylinder on the right of the piston.



Conventional Freight Car Truck with Long Travel A.A.R. All-Coil-Spring Group and Unit Snubber. (See illustration below\*)



NEW HOLLAND
RIDE STABILIZER PACKAGE

BRIDGE THE

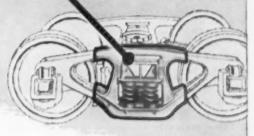
PERFORMANCE GAP

Modern High-Speed Freight-Car Truck

with NEW HOLLAND RS-1

#### RIDE STABILIZER

FOR EXISTING FREIGHT-CAR EQUIPMENT



The appreciable "performance gap" that has often been noted, between conventional freight car trucks with A.A.R. long travel all-coil-spring group with unit snubber, and freight car trucks with built-in bolster control, is now successfully-bridged.

The new Holland RS-1 Ride Stabilizer, a simple unit of radical but proven design, is easily applied to conventional type trucks and gives them riding qualities comparable to the modern high-speed trucks recently tested by the A.A.R.

Write for Bulletin No. 16A for complete technical details.



2½" Travel Spring Group with Unit Snubber Also with 1½" Travel HOLLHUND

777LC

332 South Michigan Avenue . Chicago 4, Illinois

#### QUESTIONS and ANSWERS

#### Fairbanks-Morse

#### Diesel-Electric Locomotives

This series of Questions and Answers pertains to Fairbanks-Morse diesel-electric locomotives. The references to manual and page numbers indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

- F457-Q—What should be done if wheel slipping occurs?

  A—If wheel slipping occurs, notch off throttle until slipping stops.
- F458-Q—What precaution must always be taken?

  A—Sand must not be used until slipping stops.
- F459-Q—When starting freight trains, what should be the first action?

  A—Place foot on safety control pedal and release brake.
- F460-Q—How much time is required to release brakes on a 100 car train?

  A—Normally 4 or 5 minutes, but it may take as long as 8 or 9 minutes.
- F461-Q—When the brakes have released, what should be done?

  A—Open throttle one notch at a time until the locomotive moves.
- F462-Q—Is it necessary to bunch the slack?

  A—Normally this is unnecessary. If slack is bunched, be careful to avoid damage to knuckles and draw bars.
- F463-Q—Should it be necessary to go beyond the 2nd notch to start?

  A—It should not be necessary.
- F464-Q—What would you look for in case this is required?

  A—Look for sticking brakes because coupler damage may result.
- F465-Q.—How is the load ammeter pointer affected when starting a train?

  A.—The power required to start the train may move the load ammeter pointer into the RED zone.
- F466-Q—Is this permissible?

  A—Yes, when starting it is recommended for good performance.
- F467-Q—What would be an indication of excessive tonnage?

  A—If the ammeter needle does not steadily return to the green zone, tonnage is excessive.
- F468-Q—What should be the first action when starting a passenger train?

  A—Place foot on safety control pedal, release brakes, and open throttle.

Bulletin 1706, Sec. 104-A, Page 5.

#### F469-Q—What factors must be considered as the throttle is opened?

A—1—Train weight which may vary greatly in trains of the same length. 2—Slack action depending on how many cars have tightlock couplers, and length of train. 3—Rail conditions.

#### General Motors

#### Diesel-Electric Locomotives

This series of Questions and Answers pertains to General Motors diesel-electric locomotives. The references to manual and page numbers in the text indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

- G516-Q—What may cause the dynamic brake warning light to come on before the meter needle reaches 600 amperes?

  A—Variations in idling speed of the engines, motor and generator characteristics and setting of the brake warning relay.
- G517-Q—In this case is it permissible to have the light on?

  A—The light must not be permitted to remain lit.
- 6518-Q—Why should this precaution be taken? A—The light is an overload indication and operating with it ON might damage traction motors, braking grids or grid cooling fan motors.
- G519-Q—Can the air brake be used in conjunction with the dynamic brake?

  A—When necessary, the automatic brake can be used, however, the independent brake must be kept fully
- G520-Q—What may be involved if this precaution is disregarded?

  A—The wheels may slide.
- G521-Q—As the speed decreases, at what speed does the dynamic brake become less effective?

  A—At speeds of below 10 mph.
- G522-Q—What may be done as the speed decreases further?

  A—It is permissible to completely release the dynamic brake by placing the transition lever in the No. I position.
- G523-Q—What must be done at the same time?

  A—The independent brake must be applied simultaneously to prevent the slack from running out.
- G524-Q—Depending on the gear ratio, at what speed is the dynamic brake most effective? A—Between 15 and 25 mph.
- G525-Q—What may result from careless handling of the brakes? A—Speed on grades may be allowed to "creep up."
- G526-Q—Why should this not be permitted? A—The dynamic brake is a holding brake and is not too effective in slowing down heavy trains on steep grades.

## Pour savings into your diesels... with Gulf Dieselmotive

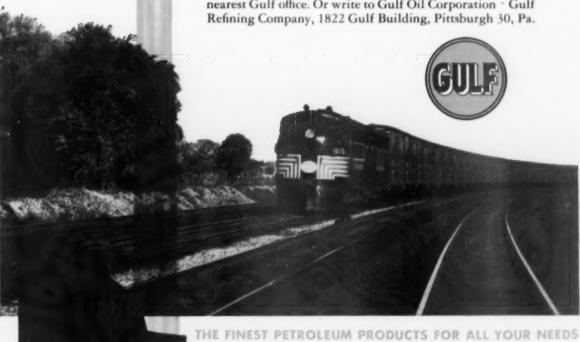
Gulf Dieselmotive is the lubricating oil that is setting new records for all-round protection and economy on many leading U.S. railroads.

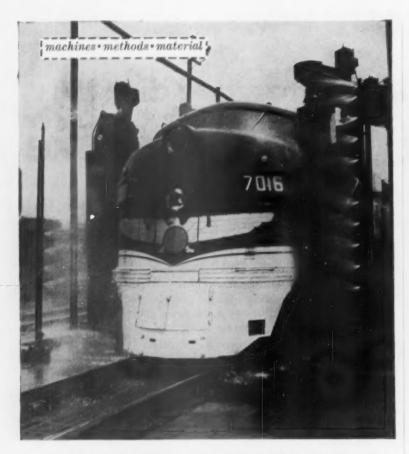
#### Here's why:

- Chosen for their ability to prevent hard carbon deposits in hot spots, the selected base stocks of Dieselmotive oil also provide an oxidation resistance safety factor.
- 2. 100% solvent refining of base stocks (which removes undesirable constituents) guarantees greater stability and more effective bearing protection.
- Superior additive response is obtained by carefully matching the additives to the base stocks. This insures clean rings and grooves, a minimum of piston crown deposits.

All these quality features add up to a tough filmed, heavy duty detergent oil that delivers benefits like these: Cleaner engines, less wear, greater economy, and higher availability.

Ask a Gulf Sales Engineer to recommend the proper grade of this outstanding lubricating oil for your diesels. Consult the telephone directory for the number of your nearest Gulf office. Or write to Gulf Oil Corporation Gulf Refining Company, 1822 Gulf Building, Pittsburgh 30, Pa.





### Fast Working Cleaners Cut Costs of Washing Diesels, Cars and Trucks!

Even on the exterior of diesels with accumulated oil, grease and road dirt, Magnus 5 RR will prove its cleaning effectiveness with your present equipment. For periodic general exterior cleaning of diesels and cars, to remove oxide film, Magnus 85, a mild acidic cleaner, cleans efficiently and rinses freely. For regular cleaning of cars requiring a mildly alkaline cleaner, many railroad maintenance departments use Magnus 1-RR.

For heavy duty cleaning of trucks, wheels and underframes of diesels and cars, Magnus Solvite Truck



Cleaner will remove the toughest, hard-to-remove soils. It can be applied manually or by automatic washing equipment.

Inside or outside for major overhauls or routine surface cleaning, there's a specialized Magnus product for every need.

For your free copy of the illustrated Magnus Railroad Cleaning Handbook, write to Magnus, 77 South Avenue, Garwood, N. J.



MAGNUS CHEMICAL CO., INC.

-a world-wide organization specializing in cleaning and protection of all surfaces.

#### PERSONAL MENTION

L&N (Continued from page 18)

South Louisville, Ky.

D. C. Watson appointed manager of employee relations,

J. A. Parrish, master mechanic, Louisville Division, has had jurisdiction extended to include running repairs of diesel locomotives.

W. C. ROLLINGS appointed shop superintendent.

#### Minneapolis & St. Louis

WALTER W. LOVETT, appointed superintendent of shops at Cedar Lake, Minn. Formerly roundhouse foreman, Illinois Central, at Chicago.

#### New York Central

New York

V. F. Kania appointed general inspector. J. J. Ward appointed assistant supervisor personnel—mechanical.

#### Norfolk & Western

Roanoke Shops

WILLIAM UNICK, assistant foreman, machine shop, retired.

R. A. HENRY, Jr., an assistant foreman, appointed assistant foreman, machine shop.

M. C. Lawson, assistant foreman, erecting shop, transferred to machine shop as an assistant foreman.

#### Northern Pacific

St. Paul

E. C. Estes, mechanical engineer, retired.
H. E. Bowie, assistant to the mechanical

engineer, appointed mechanical engineer. C. C. Bennett, chief draftsman, mechanical engineer's office, appointed assistant to the mechanical engineer.

#### Pennsylvania

Northwestern Region, Chicago

O. F. Opatz, supervisor diesel equipment, retired,

P. D. Hold, assistant shop foreman, appointed supervisor diesel equipment.

#### St. Louis Southwestern

H. R. LEGGETT, assistant road foreman of engines at Pine Bluff, Ark., appointed road foreman of engines.

#### Union Pacific

Omaha

GEORGE L. WALES, superintendent of shops, retired.

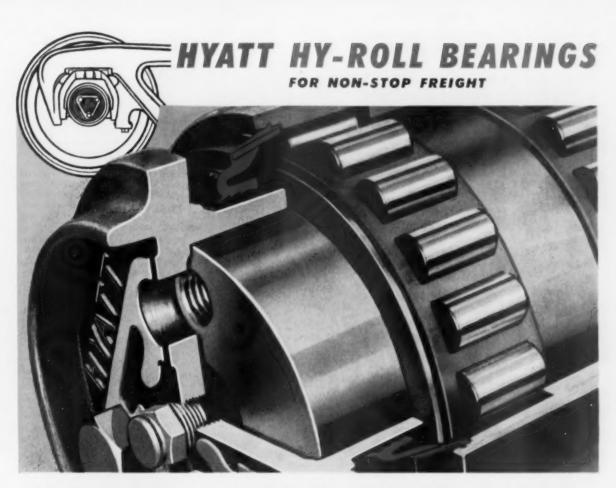
ROY C. COCHBAN, general foreman, locomotive, appointed superintendent of shops,

#### Western Maryland

S. K. Bonebrake appointed supervisor locomotive performance at Hagerstown, Md.

#### Obituary

GEORGE H. HUENEMEIER, general foreman, Litchfield & Madison, died July 10.



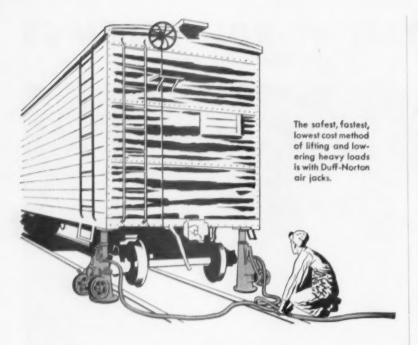
#### REDUCE MAINTENANCE COSTS

Straight cylindrical rollers, positively sealed in 3-year lubricant supply, assure more troublefree service

HYATT HY-ROLL BEARINGS combine the proved dependability of straight cylindrical rollers with the long-run economy of the most simplified design ever developed. The outer race, for example, has been completely eliminated—the housing takes its place. There are only four parts on the axle; all parts are interchangeable. One basic bearing fits both old and new cars. The positive seal keeps lubricant in and everything else out. These features reduce installation, maintenance and inspection costs to a new low. Hyatt's longer-lived straight cylindrical rollers cut long-run operating costs even further. It all adds up to just this: your investment in roller bearing freight pays greater dividends when you specify HYATT HY-ROLL Bearings. Hyatt Bearings Division of General Motors, Harrison, New Jersey.



TO RAILROAD PROSPERITY



#### How one man with air power can lift an empty car in less than 2 minutes!

One man wheels a pair of precision built, 20-ton capacity, 28-in. high Duff-Norton air motor powered screw jacks (Model 228-R) into position one at a time, connects them to the "Y" valve, then turns the dual controls and up goes the car 18 inches (the maximum height) in less than 2 minutes. Ordinary shop pressure of 80-100 lbs is all you need to operate these time and money saving jacks.

Other models available in 35, 50, 75, 100-ton capacities capable of lifting and holding the heaviest diesels or cars without danger of creeping, over-running, or dropping the load because these are safe, dependable, time-tested screw jacks with air power used only to turn the screw. Even if the air failed or line were severed, load couldn't drop. Air motor must be used also to lower load.

Thousands of these jacks are in use by leading roads throughout the world and have been for 20 years.

If you use air now for other tools, why not use it to raise and lower locomotives, cars (empty or loaded), handle heavy machinery, repair bridges, push large diameter culvert pipe through solid earth

Write for 8-page illustrated brochure giving complete specifications on the 6 models available and how they pay for themselves in a short time. Ask the world's oldest and largest manufacturer of lifting Jacks for brochure AD-11-G, Duff-Norton Company, Pittsburgh 30, Pa. There's no charge or obligation whatsoever.

## DUFF-NORTON



#### SUPPLY TRADE NOTES

WESTINGHOUSE AIR BRAKE COM-PANY, AIR BRAKE DIVISION .- W. B. Kirk, engineer of development and head of the test section, has been appointed chief engineer. G. T. McClure, chief design engineer, has been appointed advance product engineer, heading a newly organized group charged with selection and design research on new products in the air-brake field. C. M. Hines, general engineer, has been appointed engineering manager.

T-Z RAILWAY EQUIPMENT COMPANY. Bruce C. Gunnell has been appointed railroad representative in southeastern ter-

E. V. NIELSEN, INC .- George W. Hoover, manufacturers' sales agent, New York, has been appointed by Nielsen to handle their new Service Bi-Way studder.



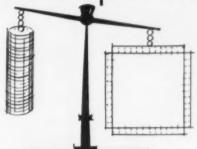
H. T. Doughty

STRAN-STEEL CORPORATION .- H. T. Doughty has been appointed chief engineer, Transportation Products Department at Detroit, succeeding H. B. Hoesly, resigned. Mr. Doughty was previously design engineer. O. S. Laing has been appointed district manager of the department's Omaha-Denver-Twin Cities area, Mr. Laing will be located at 708 South 10th street, Minneapolis.

HUCK MANUFACTURING COMPANY .-Donald V. Steele and William Messer have been appointed field engineer in charge of western Missouri, Kansas and Iowa territories and northern Illinois, northern Indiana and Northwestern Ohio, respectively. Daniel R. Bortner has been appointed sales engineer, with headquarters in Baltimore. Mr. Bortner will represent the company in Maryland, eastern Pennsylvania, Delaware, and southern New Jersey.

THOR POWER TOOL COMPANY .- John P. Bank, works manager at Aurora, Ill., has been appointed sales engineer. Richard E. James, Jr., Birmingham, Ala., branch





worth to you?

api can increase its

productive value!

API's local inventory and service facilities can help you increase square foot floor space value for productive uses by eliminating heavy warehousing requirements.

At any of API's local inventory and service centers, you will find a wide variety of A-MP\* Terminals. Connectors and Tools to meet all your service requirements. Order only the amount to satisfy your service needs. Call API's nearest branch office for inventory, service and technical assistance!

In addition to branch offices, API maintains a group of local telephone information centers for your convenience.



### dependability 2 ways

The product and the product knowledge of the API man who serves you.

#### AMERICAN PAMCOR, INC.

Subsidiary of Aircraft-Marine Products, Inc. 181 Hillcrest Ave., Havertown, Pa.

Hawtherne, Cald San Francisco, Cal eWashington, D.C. Atlanta, Ga. Chicago, III. \*Indianapolis, Ind. \*Baltimore, Md. Boston, Mass.

"Minnespoirs, Minness City, Mo. St. Lours, Me. Maptewood, N.J. "Aibany, N.Y." "Buffalo, N.Y." "Charlotte, N.C.

\*Dayton O
\*Portland Ore
Philadelphia, Pa
Pittsburgh Pa
\*Innaville Teon
Dellas, Tea
\*Richmend Va
\*Kentington W Vi
\*Milrachee Wis

\*Consult the yellow pages of your local telephone directory under AMERICAN PAMCOR, INC., for local tele-



Here's true accuracy with the exclusive TOLEDO receding die principle—best for deep sealing, smooth tapering pipe threads for 2½ to 4" pipe or conduit. Cuts standard, over or undersize threads. Excellent for steel, wrought iron, brass, copper or cast iron pipe. Simple construction—easy to set up and use. Take our tip—it's tops.



This 75 lbs. power vise makes threading, cutting and reaming a fast, simplified operation when out on the job. Carry it practically anywhere. Sturdy tripad legs, self-centering jaws and quick-acting wrenchless chuck. Polished aluminum housing—dependable ge-tred action—precision construction throughout. Get your order in early for this fast-moving profit maker.

#### **TOLEDO PIPE WRENCHES**

The wrench for everyday work load punishment.

Unconditionally guaranteed TOLEDO
quality. Sturdy frame and jaw,
positive grip, quick easy
adjustment. The wrench
for your heavy-duty
jobs. See it today. Try it out.

THE TOLEDO PIPE THREADING MACHINE CO. . TOLEDO 4, OHIO

TOLEDO

PIPE THREADERS - PIPE WRENCHES - PIPE MACHINES

service engineer, has been appointed manager of the company's new Indianapolisbranch to be opened this fall,

The Milwaukee branch office has been moved to a completely new building at 3911 West Greenfield avenue.

COLORADO FUEL & IRON CORPORA-TION.—The Philadelphia district warehouse and sales office has been moved to 225 West Erie avenue, The new headquarters has 125,000 sq ft of warehouse space and 7,500 sq ft of air-conditioned offices.

SPEER CARBON COMPANY,—Millard S. May, sales manager, carbon products division, has been appointed manager tech-

nical services for the division, and has been succeeded by Ives L. Harvey. C. S. Boland has been named assistant sales manager of the division, and sales manager of flashlight and carbon products.

H. K. PORTER COMPANY.—The Electric Service Manufacturing Company of Philadelphia, Pa., has been acquired by the Porter Company. R. Kreinberg, president of Electric Service, and others of the management staff, will continue with the new Porter unit.

FRANKLIN BALMAR CORPORATION.

The Franklin Balmar Corporation, a wholly owned subsidiary of the Franklin Railway Supply Company, has been merged

with the parent company and the name Franklin Balmar Corporation adopted. Administrative offices are at 60 East 42nd street, New York, and the business offices and plant in Woodberry, Baltimore.

PACKLESS METAL HOSE INC.—Murry B. Johnson has been appointed sales manager.



R. Schey

RUST-OLEUM CORPORATION.—Robert Schey, formerly general superintendent of the car department of the Nickel Plate, has been appointed head of sales in the Rust-Oleum eastern railroad sales region, operating out of Cleveland.



R. W. Hopewell

GOULD-NATIONAL BATTERIES, INC., Robert W. Hopewell has been appointed manager of field service, with headquarters in Trenton, N.J.

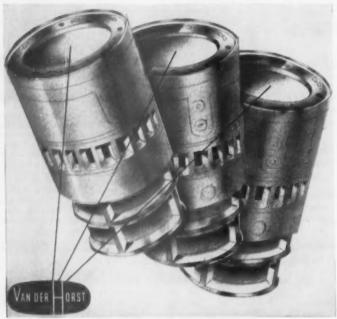
GREENVILLE-EVANS COMPANY.—Maj. Gen. John P. Doyle, USAF (retired), air force director of transportation, has been named vice-president of Greenville-Evans, an organization formed by the Evans Products Company, Plymouth, Mich., and the Greenville Steel Car Company, Greenville, Pa., to modernize old freight cars. Gen. Doyle will be located in Plymouth.

ALLIED STEEL CASTINGS COMPANY.

—John H. McCartney of Philadelphia has been appointed eastern representative, and Dolph R. Elmore of Washington, D. C., southeastern representative.

LINCOLN ELECTRIC COMPANY. — An eight million dollar expansion program for manufacturing arc welding machines and

### 5 hig advantages of



PORUS - KROME

Good for the Life of your Expires

- INCREASES CYLINDER LIFE 3 TO 8 TIMES.
- . INCREASES PISTON RING LIFE UP TO 50%.
- . ELIMINATES STOCKING OF OVERSIZED PISTONS AND PISTON RINGS.
- DEFINITELY CONTRIBUTES TO REDUCED DOWNTIME FOR ENGINES.
- . DEFINITELY CONTRIBUTES TO A REDUCTION IN LUBE OIL CONSUMPTION.

-Write Dept. F-1, VAN DER HORST CORP., OLEAN, N. Y.-

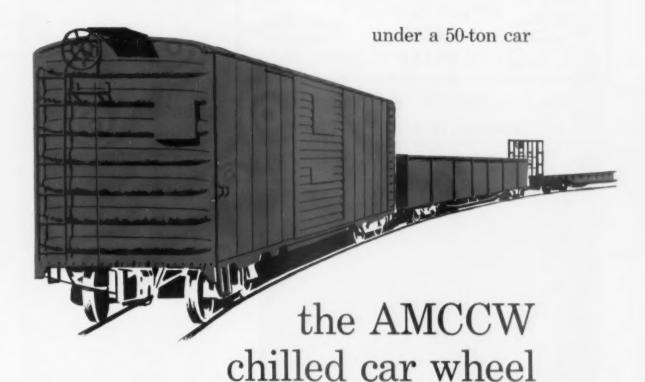
OLEAN, NEW YORK
HILVERSUM, HOLLAND
CHICAGO, ILLINOIS



TERRELL, TEXAS

LOS ANGELES, CALIFORNIA

\*SparTan Engineering



The heavier flange and improved brackets designed into the AMCCW chilled car wheel approved by the AAR in 1950 makes it an outstanding performer under 40- and 50-ton freight cars.

gives top performance

This wheel is high in safety performance as measured by ICC records throughout the country for all types of freight car service—over 160 million car miles per wheel failure in 1955, the latest year for which complete figures are available.

The AMCCW chilled car wheel is low in cost, high in performance and is immediately available from 30 plants in the U.S. and Canada.

#### Association of Manufacturers of Chilled Car Wheels



445 North Sacramento Blvd., Chicago 12, Illinois

Albany Car Wheel Co. • Southern Wheel (American Brake Shoe Co.)
Griffin Wheel Co. • ACF Industries • Marshall Car Wheel & Foundry Co.
Pullman-Standard Car Mfg. Co. • Canada Iron Foundries, Ltd.
Canadian Car & Foundry Co., Ltd.



### REFLECTOSCOPE TEST

TEST SULLETIN



### Combination of Wheel-Truing and ULTRASONIC INSPECTION

Cuts Maintenance Costs-Improves Safety

Photo courtesy Union Pacific Railroad



Modern wheel-truing machines make it possible to restore wheel-tread contour without pulling the wheels and axle from under the locomotive.

Periodic wheel maintenance can be performed more quickly and at lower cost with this new equipment. However, such procedure eliminates the opportunity for usual inspection of axles by magnetic particle or similar visual methods, which require axle removal.

Regular inspection of diesel axles is more important today than ever before. Higher speeds and heavier loads accelerate fatigue failure, place increased emphasis on safety and the importance of a complete maintenance program. The problem is how to inspect axles in a periodic maintenance schedule which no longer requires their removal from the engine.

Reflectoscope inspection supplies the answer: Accurately testing axles under the engine in a matter of minutes, the Reflectoscope has proved an ideal working partner to the wheel-truing machine. While the locomotive is on the wheel-truing machine, a Reflectoscope inspection is made of each axle. Any defective axles are located by the Reflectoscope. Adequate periodic inspection of vital components is assured. Only sound units leave the shop.

#### How it Works



For diesel exist testing, special "Angle-Beam" Search Units are used. These units project ultrasonic inspection beams at an angle instead of in a straight line. Angle-beam search permits testing of fillets and similar critical axle areas which cannot be inspected with a straight search unit.



A visual picture of any defect and its location in the material appear on the Reflectoscope screen. The instrument tests "in place" without disassembly. Procedures are simple—results positive and immediate.

Mechanical Departments will find that Sperry Rail Service offers the most advanced nondestructive inspection equipment yet developed for practical railroad applications. For complete information return the attached coupon,



Danbury, Connecticut

Send details of Ultrasa	nic inspection for railroad equipment.		
Name	Title		
Address			
City	State		

electrodes is under way at the Lincoln Cleveland plant. The project is expected to be completed within three years.

GRAYBAR ELECTRIC COMPANY.—L. J. O'Connell has been made manager, transportation sales, at New York. He was formerly manager, communications sales, at Omaha.

#### EQUIPMENT

(Continued from page 12)

the blanket resists any settling that might be caused by constant vibration of rail travel. Fibers in the product are said to be long and uniform, providing an insulation with high tensile strength and uniform insulating properties. The blanket comes in rolls up to 200 ft in length, weighing as little as ½ lb per cu ft.

The Microlite is non-cellular and noncapillary in itself and the glass fibers will not burn or support combustion. L. O. F. Glass Fibers Company, Dept. RLC. Toledo, Ohio.



#### Dynamic Balancing Machine

The Mogul dynamic balancing machine is of pedestal type design, permitting units to be placed together or separated to accommodate the shortest to the longest type rotors. The unit can be either end or center drive and no special mounting or holddowns are required. The standard and heavy duty models weigh 10,000 and 20,000 lb, respectively.

The machine is equipped with Raydyne true seismic, free-in-space mounting system whereby the rotor is free to oscillate for unbalanced detection. The Raydyne inertia actuated unbalance indicator system travels with the work piece for accurate indication of unbalance values. The variable speed power motor drive permits operation over a wide range of speeds and enables the operator to correct large amounts of unbalance at low safe speeds. The unit is maintenance free. Raydyne Corporation, Dept. RLC, 920 West Laurel street, Springfield, Ill.

#### Monorail Type Hoists

What is believed to be industry's first application of minute eddy current braking, according to the manufacturer, has (Continued on page 102)

## Why ATIONAL brushes are best for diesel-electric switchers

For the constantly varying service conditions of switcher locomotives, you need brushes with proven commutating ability. Here are some of the reasons why you can depend on "National" brushes:

 Healthy film keeps commutator in excellent condition for longer life.

• Top performance under varied loads-

from idling to steep climbs with full load.

 High brush strength to absorb constant shocks from frogs, crossovers and switches.

 Millions of test miles go into the proving of each grade before it is offered for regular service.

For all types of diesel operation "National" brushes give you more for your brush dollar. ATIONAL BRUSHES Best for all types of equipment . . . preferred for all types of service

The term "National", the Three Pyramids Device and the Silver Colored Cable Strand are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY • A Division of Union Carbide and Carbon Corporation • 30 East 42nd Street, New York 17, N. Y.

Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. In Canada: Union Carbide Canada Limited, Toronto



## For Progressive Railroading

## GREAT NORTHERN RY. CO. IS EQUIPPING 1,800 CARS

pad lubricators

MILLER



PAD LUBRICATOR



- Cost \$40 per carset (for all sizes)
  - Life expectancy—6 years

MILLER LUBRICATOR CO., WINONA, MINN.



, , for reproducing the finest and most durable type of lettering plus designs by the spray-gun method on locomotives, passenger cars and other types of equipment . . accepted and used today by 1/3rd of the major railroads . . . let us prove this to you.

WISS OF WEITE BAILWAY SALES DEPARTMENT

#### THE DEMP-HOCK CO.

21423 MOUND ROAD, VAN DYKE, MICHIGAN



Seales & Chirmgo & Philodelphia & St. Louis & Sen Francisco & Washington D. C.

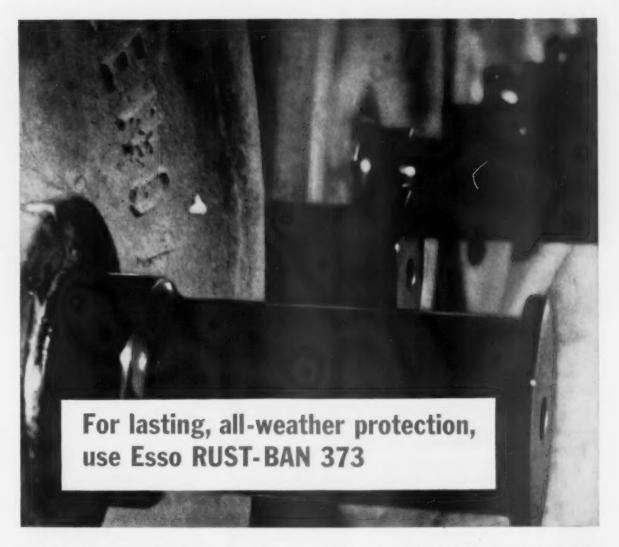


### NEW SWEENEY "POWERENCH" SOCKETS LAST UP TO SIX TIMES LONGER... FOR CONVENTIONAL OR IMPACT USE!

Because of their unique design, the new Sweeney "Powerench" Sockets last far beyond normal expectations. The above Sweeney Socket was used more than 6,000 times with an impact wrench on traction motor suspension bearing nuts, in one of the roughest tests you can give a socket.

Ounce-For-Ounce, Sweeney "Powerench" Sockets are the strongest made. Write for information now.

B. K. SWEENEY MFG. CO., DENVER 17, COLO.



Esso Rust-Ban 373 gives equipment complete protection from corrosion in one fast application. More and more railroads are finding it ideal for stored parts such as axle journals and other heavy machined parts which may be stored outdoors for extended periods.

#### Esso RUST-BAN 373 offers four important advantages: —

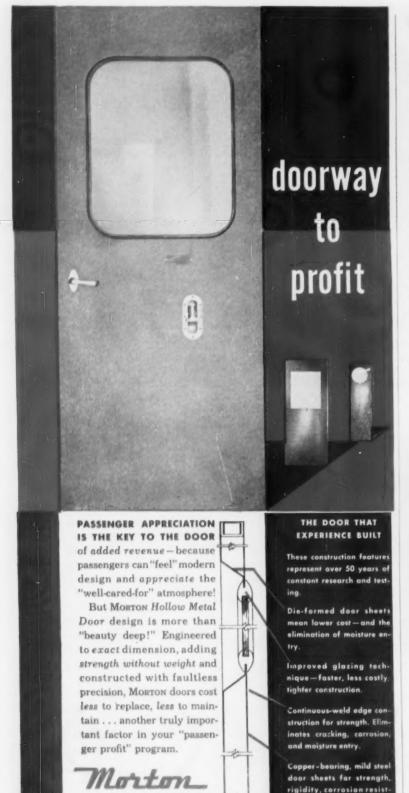
- 1. No heating is required in applying Rust-Ban, permitting speedy application at normal temperatures by dip, spray or brush.
- 2. Its high resistance to abrasion means one coat lasts longer. The extremely durable coating of Rust-Ban safeguards equipment even after rough handling.
- 3. It dries to a hard film that is unaffected by rain and direct sunlight. And to withstand low temperatures, Rust-Ban contains special additives to prevent cracking and chipping. This all-weather protection keeps surfaces corrosion-free, saves expensive part replacements.
- 4. Economy is provided by excellent coverage about 350 square feet per gallon. And Esso Rust-Ban 373 is easily removed by any good petroleum solvent such as Varsol.

Esso Rust-Bans are available in several types to meet every preservative need. For more information, write: Esso Standard Oil Company, Railroad Sales Division, 15 West 51st St., New York 19, N. Y.





Esso offers a complete line of dependable railroad products - Valuable years of experience in research and development, along with continual testing on the road and in the lab, stand back of the outstanding performance of Esso Railroad products.



MANUFACTURING

5125 West Lake Street,

Chicago 44, Illinois

COMPANY

#### EQUIPMENT

(Continued from page 98)

been applied to these electric monorail type hoists. The braking principle should find its greatest usage where exceedingly gentle hoisting and lowering is essential because of the nature of the load,

The eddy current brake is said to give positive, accurate control from no load to full capacity when hoisting or lowering by electromagnetically, providing a full capacity load on the hoist motor at all times. The brake literally senses the percentage of full capacity load being handled and multiplies brake load resistance for full load at all times.

This brake consists of a stationary field ring centered around a rotor mounted on anti-friction bearings. The rotor turns in the field of magnetic flux with no mechanical or electrical connections. Poles of the field ring are also stationary. Braking force is accomplished through the braking of magnetic lines of force between the stationary pole ring and the revolving rotor.

Sensitive control of the brake makes it applicable for the critical handling of loads up to 25 per cent of rated capacity of the hoist. Yale & Towne Manufacturing Co., Dept. RLC, 11000 Roosevelt Blvd., Philadelphia 15.



#### Self-Sealing Coupling

When connected, the self-sealing coupling permits full flow of fuel and, according to the manufacturer, eliminates fuel spillage during refueling operations of diesel locomotives. One half of the coupling is attached to the outlet end of the fueling hose. During fueling, it is coupled to the mating half on the locomotive's tank inlet.

The device may be combined with a Koehler valve to permit automatic fueling to a desired level, thus preventing fuel loss due to overflow. Each half of the

(Continued on page 108)

Interior dip-painted with

materials to prevent corro





**Dated** for

your protection

#### . require no maintenance

JOY Multi-flex Diesel Control Jumpers are guaranteed to provide at least two years of satisfactory maintenance-free service . . . however, many in use today are more than five years old. If a mechanical or electrical defect develops in a JOY multi-flex jumper under normal operating conditions within two years, we'll replace it, without charge . . . and to make certain that this guarantee is faithfully fulfilled, each jumper is clearly dated when manu-

factured (see illus.). Supplied in standard lengths for 27, 21 or 16 wire circuits with silver-plated, replaceable contacts, JOY diesel jumpers are ready for use when received.

#### JOY MANUFACTURING COMPANY Oliver Building, Pittsburgh 22, Pa.

In Canada Joy Manufacturing Co. (Canada) Limited, Gali, Ontario

#### and here's why



- One-piece, prewired Neoprene jacketed assembly, eliminates incorrect connections a condition that has occurred when attachable heads are shop-wired.
  - JOY Diesel Jumpers are water-tight, shatter-proof and vibration resistant.
- Silver plating protects contacts from corrosion and increases conductivity-Protective Neoprene hanging sleeve can't slip off one-piece Jumper assembly.
- Multiple cable grouping of wiring between plugs insures maximum flexibility.

Consult a Joy Engineer

for information on these products

• Plugs and Receptacles for Air Conditioning and
Battery Charging Requirements • Dynamic Brake
and Electric Airbrake Jumpers and Receptacles •
Inter-car Communication Jumpers and Receptacles
• Rotary Sand Dryer Screeners



SINCE 1851 - OVER A HUNDRED YEARS OF ENGINEERING LEADERSHIP

### Precision Parts by MAGNUS

### mean LONGER, SAFER MILEAGE





- · Perfectly mated bearing halves
- Heat-resistant Satco lining metal
- Interchangeable double keeway
- Available for all makes and types of diesel-electrics

### High Mileage

traction motor support bearings for LONGER ROAD LIFE

The extra precision that goes into Magnus traction motor support bearings pays off in longer, trouble-free mileage on the road. Quality control of metal mixes, high precision boring and final testing of mated bearing halves under load assure an extra margin of dependability - you can't buy a better bearing.

These Magnus HIGH-MILEAGE bearings are available for replacement on all types and makes of dieselelectric and electric locomotives and MU cars. For the complete facts, get your free copy of Bulletin No. 6000.

#### D-16 FLANGE LUBRICATOR increases mileage between wheel turnings up to 40%

This new, more positive method of flange lubrication not only gives greatly extended wheel life, but substantially reduces shop costs, too. Oil pressure to each flange is positively controlled by six individually adjustable pumps that are gang-operated

from a common linkage to the truck frame. Unit operates only when locomotive is moving. Can be used to lubricate center pin wear plate also, if desired. Full 16-pint capacity for extra mileage between refills. Write for complete information.





#### MAGNUS 391 SAFETY VALVE

for dependable overload protection on diesel locomotive steam generators

This high-precision safety valve is specially made for railroad service on diesel locomotive steam generators. Opening and blowdown pressure adjustments are easily accessible and self-locking. Flexible metallic bellows prevent escape of steam into the generator compartment. Write for full details.

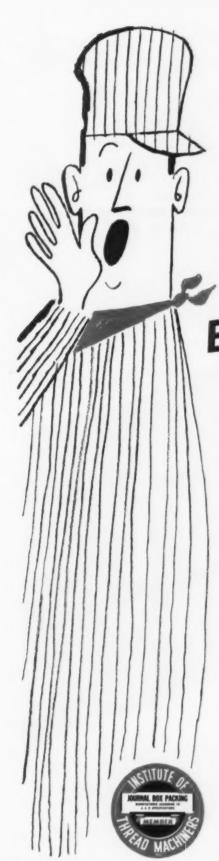
#### MAGNUS

**Metal Corporation** 

subsidiary of

IONAL LEAD COMPANY

111 Broadway. New York 6, N. Y. 80 E. Jackson Blvd.,



### **Proved Service** and Economy versus **Expensive Substitutes**

#### Simple Arithmetic

2,000,000 Freight cars packed with unproved substitutes such as pads, etc. @ an average price of \$50.00 per car set.

\$100,000,000.

2,000,000 Freight cars packed with approved A. A. R. Journal Box Packing @ approximately \$4.90 per car set.

\$ 9,800,000.

Difference in savings to Railroads.

\$ 90,200,000.

This is real economy.

There is no economical replacement for A.A.R. Approved Journal Box Packing.

Think this over and avoid being stampeded into exorbitant expense for unproved gadgets.

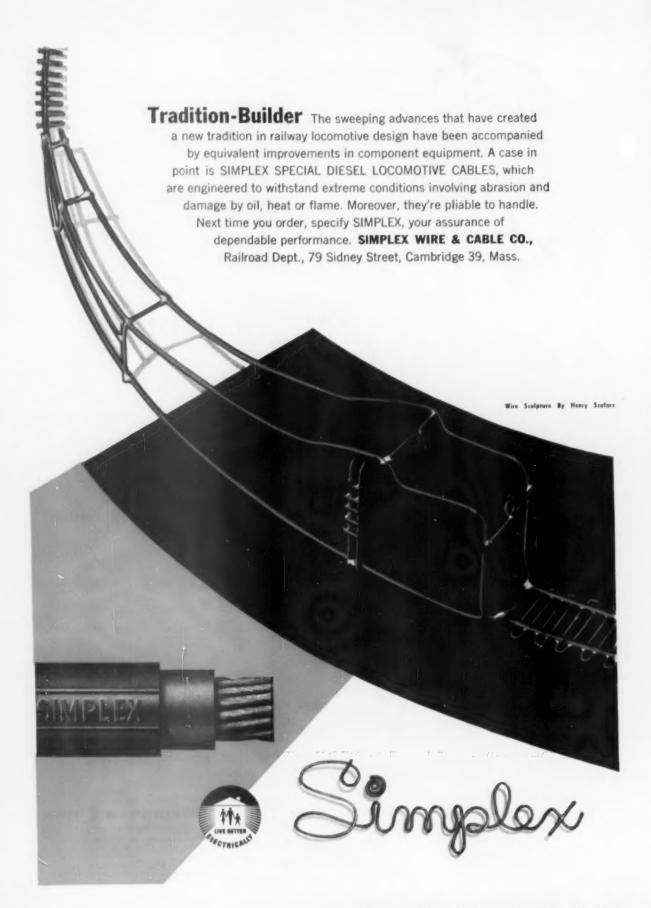
#### INSTITUTE OF THREAD MACHINERS, INC.

141 East 44th Street, New York 17, New York

Atlas Processing Corp., New York, N. Y.

Meyer Burstein & Sons, Neenah, Wisconsin
Dallas, Texas
The J. Milton Hagy Waste Works, Philadelphia, Pa.
John J. McGrath, Inc., Philadelphia, Pa.
John J. McGrath, Inc., Philadelphia, Pa.
Twin City Textile Mills Waste Co., Isc., Norfolk, Va.

Twin City Textile Mills Waste Co., St. Paul, Mion.





### Lewid-sealtite car bolts

Each Lewis Sealtite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit... without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning . . slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

LEWIN BOLT & NUT COMPANY
SOA METERIM AVE. S. E.
MINNEAPOLIS 14, MINNESOTA



#### HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

- AIR-BRAKE FITTINGS. Four-page folder describes AAR approved couplings, flanged connectors and fittings for piping on railroad cars. Shows also applications on airbrake equipment. (Write: Dresser Manufacturing Division, Dept. RLC, Bradford, Pa.)
- WARNING SIGNAL. Bulletin 632 gives information on Gyralite flashing visual warning signal for trains, shop trucks, open work areas, etc. (Write: Pyle-National Company, Dept. RLC, 1334 North Kostner avenue, Chicago 51.)
- 3. DIESEL DESIGN. 12-page booklet, "Alco 251 Diesels," gives dimensions and specifications for In-Line 6, Vec-12 and Vec-16 engines. Shows cross-section of Vec model, and briefly describes and illustrates parts at reference points which are applicable to all models. (Write: Alco Products, Inc., Dept. RLC, 30 Church street, New York 8.)
- 4. WELDIRECTORY, Newest iron powder and other electrodes included in revised "Weldirectory for Mild Steel and Low-Alloy High-Tensile Steels" (SB-1351). Describes each electrode, its physical properties and chemical composition, and recommended welding procedures. Includes operator's reference table and a list of typical applications for each electrode, (Write: Lincoln Electric Company, Dept. RLC, Cleveland 17.)
- 5. SAFETY SOLVENT. 4-page folder (A-28) describes Turco-Solv, a detergent-action solvent for in-place cleaning of electrical equipment, also for hand wiping small parts, for precleaning prior to flaw detecting operations, and other cleaning jobs. Charts cover toxicity, flash point throughout evaporation cycle and evaporation rate of the solvent. (Write: Turco Products, Inc., Dept. RLC, 6135 South Central avenue, Los Angeles 1.)

- 6. DIESEL ENGINES. 24-page illustrated booklet, "Answers to Questions about Diesels," discusses the basic principles of diesel operation. Questions asked and answered in simple, non-technical terms. (Write: Cummins Engine Company, Dept. RLC, Columbus, Ind.)
- 7. VIBRATION MONITORS.—4-page Bulletin (500-1A) describes how vibration monitors detect mal-functions in rotating equipment and how the devices are installed and adjusted. Includes illustrations, dimensional drawings and tabulated features on standard, oiltight and explosion-proof models. (Write: Beta Corporation, Dept. RLC, P.O. Box 8625, Richmond 26, Va.)
- 8. FLOODLIGHTS. L-69A general purpose sports and outdoor area floodlight discussed in 12-page, two-color bulletin (GEA-6435), with Floodlight Classification and Applications for this and other GE floodlights. (Write: General Electric Company, Dept. RLC, Schenectady 5, N.Y.)
- 9. WIRE ROPE ENDINGS. 4-page folder (DH-351) describes, through typical application pictures. Dualoc wire rope endings for various industries, including the railroad industry, (Write: Wire Rope Sling Department, American Chain & Cable Co., Dept. RLC, Wilkes-Barre, Pa.)
- 10. ALCOA ALUMINUM HANDBOOK. 176page book presents data on aluminum
  alloys and mill products in tabular form,
  with little text. Contains information on
  alloy standards, as well as properties, sizes,
  and tolerances of mill products usually
  produced from them. Introductory section
  explains code numbering system used to
  designate alloys and their modifications.
  Subsequent sections deal with wrought
  alloys; sheet and plate; wire, rod and bar;

- extrusions; tube and pipe; electrical conductor; structural shapes; forgings, and casting alloys. Write (on a company letterhead): Aluminum Company of America, 781 Alcoa building, Pittsburgh 19.
- 11. SELF-LOCKING FASTENERS. Catalog (11B) lists and describes complete range of Nylok standard self-locking bolts and screws, set screws, hex nuts, threaded inserts, clinch nuts and cap nuts, also special purpose fasteners. (Write: Nylok Corporation, Dept. RLC, 475 Fifth avenue, New York 17.)
- 12. TUBE EXPANDERS AND CUTTERS.
  32-page catalog (No. 81) contains complete specifications for Ideal line of tube cutters and expanders; information on complete line of operating accessories; illustrations of applications; tables of sizes; ordering information, etc. (Write; Gustav Wiedeke Company, Dept. RLC, 1833 Richard street, Dayton I, Ohio.)
- 13. STORAGE BATTERIES. Bulletins Nos. 334 and 168, respectively, cover control and standby batteries for switchgear, standby power and emergency lighting and batteries for starting heavy duty gas, gasoline and diesel engines, etc. (Write: Nickel Cadmium Battery Corporation, Dept. RLC, 70 Pleasant street, Easthampton, Mass.)
- 14. SPLICING KIT. 4-page illustrated booklet. Describes advantages of tailor-made "Y" splices which can be made in the field with case and features step-by-step instructions for using the new "Scotchcast" brand splicing kit 90-BI. Chart outlines average electrical and physical properties of the epoxy resin and how it meets the needs of a moisture-proof splice-protecting material. (Write: Dept. D6-157, Minnesott Mining & Manufacturing Co., Dept. RLC, 900 Fauquier street, St. Paul, Minn.)



Headquarters for brushes for every type of rotating electrical equipment . . . backed by half a century's experience in developing and producing dependable earbon-graphite and metallic powder materials and components.

#### STACKPOLE CARBON COMPANY, St. Marys, Pa.

Plants: St. Marys, Penna. (2)..... Kane, Penna. (3)......
Johnsonburg, Penna.... Canadian Stackpole, Toronto, Ont.

#### EQUIPMENT

(Continued from page 102)

coupling seals without loss of fuel when disconnected. No hand shut-off valve is needed on the fueling hose. Fire hazards are thereby eliminated. Aeroquip Corporation, Dept. RLC, Jackson, Mich.



#### Industrial Telephone Booth

The Accusta-Booth has been designed to prevent telephone conversations from being overwhelmed by the roar of industrial plants and noisy buildings. It has a 44-in, high opening for the head and shoulders of person talking on the phone and attaches to the wall. It weighs 26 lb.

Research tests have shown that noise inside the booth is reduced to nearly the level of the murmur in an average business office. Other uses for the booth, according to the manufacturer, includes bus and train stations, garages, etc. Detroit Macoid Corporation, Dept. RLC, 12340 Cloverdale, Detroit 4.



#### Universal Cylinder Mountings

These mountings eliminate problems due to misalignment between cylinders and their loads thereby reducing costs associated with breakage of mechanical devices and cylinders. They are available in two forms—as a hinge mounted unit with universal mounting brackets at each end, and as a cylinder with universal trunnion and universal mounting bracket for the rod end.

Applications include the operation of hopper gates, elements rotating about shafts



### THAT MEASLY LITTLE GRIT... Can and Does Chew Up Diesel Engines

WIX makes a "big production" out of a little destruction . . . but that "little destruction" can add up to millions of your dollars!

Contamination in fuel and lubricating oil is a continuing problem. You can trace the service life and performance pattern of your diesel engines in direct relation to the cleanliness of lube and fuel oil and see exactly how important engineered filtration is to you!

WIX Oil Filter Cartridges are the product of objective research and en-

gineering. They do a superlative job of keeping oil clean. They represent a solid form of insurance against excessive downtime, maintenance cost and engine wear.

Write for the WIX Railroad catalog. It has a definite answer for you.



WIX CORPORATION • GASTONIA • N. C.
WIX ACCESSORIES CORP. LTD., TORONTO, ONT., CANADA
Warehouses:

GASTONIA · NEW YORK · ST. LOUIS · DES MOINES · SACRAMENTO



#### MORE OF THE GARLOCK 2,000





Garlock diesel replacement parts are pre-stocked in handy packages, ready for shipment.

#### Your GARLOCK Salesman

has a better understanding of the problems of railroad packing and sealing because that's his sole responsibility. For 68 years, Garlock representatives have applied their knowledge to solving the packing problems of railroads.

Profit by this experience. It is yours for the asking.

Remember, diesel parts are only part of "the Garlock 2,000" ... two thousand different styles of packings, gaskets, and seals to meet all your needs. It's the only complete line . . . it's another reason you get unbiased recommendations from your Garlock representative. Call him, or write for complete diesel parts-and-price list.

THE GARLOCK PACKING COMPANY, Palmyra, New York

For Prompt Service, contact one of the 30 sales offices and warehouses throughout the U.S. and Canada.



Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints



such as gear segments and levers. and objects moving on wheels or tracks such as trucks or transfer tables. The mountings are said to compensate for deflection and misalignment where cylinders are connected to structures that are rivited, bolted or welded together. Hanna Engineering Works, Dept. RLC, 1765 North Elston avenue, Chicago 22.



#### Engine-Driven Welder

This heavy-duty engine-driven welder has direct coupling between the engine and the generator. Standard equipment includes a reversing switch, battery starting, and side panels. It is of extra heavy steel construction and has no projecting generator or controls.

It is available in 300 and 400-amp models with either a two- or four-wheel trailer arrangement. A small 12-in, wheel on the tow bar of the two-wheel trailer simplifies handling.

According to the manufacturer, maintenance is considerably reduced. The constant pressure brush springs require no adjustment and the generator's sealed bearing eliminates relubrication. An exciter is not needed.

Both welder models have a duty cycle of 60%, rated temperature rise of 50 C, open circuit voltage of 80, and maximum speed of 2,150 rpm. The 30AG, or 300amp unit, has a welding range of 60 to 375 amp and an electrode capacity of 3/32 to % in. The 40AG, or 400-amp unit, has an operating range of 80 to 500 amp and an electrode capacity of 1/4 to 1/4 in. Gasoline-driven models are equipped with 54-hp Hercules JX4 engines. General Electric Company, Dept. RLC, Schenectady 5, N. Y.

#### Protective Tank Liner

Tankite, is a development for use as a liner in storage tanks, aircraft, truck and automobile tanks. According to the manufacturer, the product is unaffected by petroleum products from lubricating oils up to and including 100 octane gasoline. It retains its adhesion and flexibility even though immersed in gasoline.
Films are applied from an emulsion

### Revolutionary AlRengineering Development by Ingersoll-Rand...

## Torque control **IMPACTOOLS**

MULTIPLE TORQUE SETTINGS 2 TORSION BARS AVAILABLE:

- . No. L735. Max. tarque 60 ft. Ibs.
- No. H735, Max. torque 90 ft. Ibs

Now you can have precision torque control with all the nut running power and speed of the world famous I-R IMPACTOOL!



Sixe 50407

"For torques up to 550 ft. lbs., a Sixe 5340T Torque Control Impactagl is available

... how can YOU use these ADVANTAGES ON NUT RUNNING JOBS where prescribed torques must be met?

- POSITIVE TORQUE CONTROL-a revolutionary use of a rugged steel torsion bar for precision control of torque-combined with the power and speed of the Impactool.
- SIMPLE TORQUE SETTING-torsion bar adjusting sleeve is clearly calibrated for changing torque with easy-to-use torque jig.
- . TORQUE SETTING REMAINS CONSTANT-for any nut running condition until the adjustment is changed.
- ELIMINATES "OVER-TORQUE"—impact mechanism rebounds in-stantly when preset torque is reached, tripping a foolproof rubber faced shutoff valve.
- LOW MAINTENANCE—combines many of the proven features of Ingersoll-Rand Impactools, with their enviable record of dependable performance and low maintenance.
- REVERSIBLE-full power in either direction.
- NO CLUTCH—to wear, slip or require adjustments.

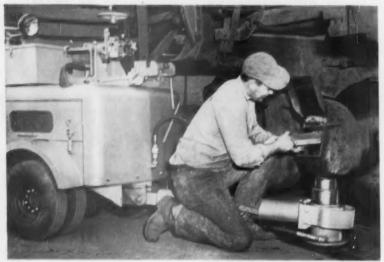
Torque can be quickly and easily set, using the jig as shown above. The torsion bar automatically shuts off the tool when the nut running resistance becomes equal to the stress in the preset forsion bar.

Ask your Ingersoll-Rand AlRengineer for a demonstration now . . . or write direct for more information on this amazing development.

Ingersoll-R

Impactool Division 11 Broadway, New York 4, N.Y.

### Double cars one man can service



Yu-Brasser is extremely mabile, operates on both paved and unpaved surfaces, or snow and ice.

## Use Self-Propelled YU-BRASSER

One Man Removes and Trims Brasses on Spot, Opens Oil Rolls, Replaces Brass in just 2 to 3 minutes; also Lifts Cars for Inspection and Greasing of Side Bearings and Center Plates.

Yu-Brasser, the only mobile, combination journal jack, brass trimmer and car lift, completely mechanizes car servicing. It's hydraulically driven and operated...speeds many phases of car servicing, including box repacking.

Operators Like Safety—Its safety and ease encourage inspections. Spotting, lifting and release of jack is controlled from steering platform—no dangerous hand placement. Makes journal box servicing a preferred job.

Quickly Amortized – Using Yu-Brasser, one man jacks journal boxes and cars, empty or loaded, in seconds. It more than doubles the number of cars he can service, cuts servicing costs 50 to 75%. By trimming on spot and

replacing already-seated brasses, you save 50% or more on brass. These savings quickly pay for your Yu-Brasser.

You can buy Yu-Brassers on try-before-you-buy or lease basis. For full details, write, wire or telephone Now to Earle C. Webster, National Sales Representative, 55 New Montgomery St., San Francisco 5, Calif. GArfield 1-7119.



Car lift extension in use. See how Yu-Brasser works parallel with car, important in cramped quarters.

Manufactured by

YUBA MANUFACTURING CO. 701 H Street, Benicia, California thereby eliminating toxic solvents and fire hazards during application. Smaller tanks may be partially filled with the product and rotated to cover all surfaces. For spray application it may be reduced with 1 qt of water per gal.

Two spray or brush coats, one day apart, are recommended as the minimum for ferrous metal tanks and a minimum of four coats should be applied to poured concrete. More porous surfaces must be treated with a suitable filler before application of the coating.

Coatings should be allowed a minimum of 24 hrs drying time at room temperature. Tankite may be force cured by introducing a stream of warm air into the coated tank. Air temperature should be maintained at 140 deg F or more for at least 2 hrs. If temperature of 325 deg F may be applied, the product will attain its ultimate cure in 5 mins with adequate ventilation. Industrial Finished Division, H. B. Davis Company, Dept. RLC, Bush and Severn streets, Baltimore 30.



#### Electric Power Hammer

The Model H54U electric power hammer for maintenance and construction work can be used for star drilling demolishing, piercing, breaking, channelling, battering, chipping, caulking, digging, scaling, riveting, googing, routing, roughing, chiseling, cleaning, descaling, vibrating, etc., operations.

Weighing less than 13 lb, the tool is said to be easier to handle than any other power hammer. It will drill holes in concrete up to 1½ in. in diameter. Operations may be performed on a variety of materials including concrete, macadam, stone, cinder block, wood, metal, tile and earth.

Solid, hard hitting blows up to 1900 per min are assured by a spring-floated piston, with the sealed piston accelerating the piston to produce a more positive blow. The tool has hardened helical gears and a counter-balanced crank assembly. The motor is cooled by a high velocity fan. The tool is available in a standard kit, with a choice of three packaged accessory kits, or individual accessory items may be purchased as desired. Ingersoll-Rand, Dept. RLC, 11 Broadway, New York 4.

### SPECIFY ... PYLE-NATIONAL

# GYRALITE type 20775 3-lamp sealed beam unit. Over

### GYRALITES and HEADLIGHTS

SEALED BEAM OR REFLECTOR TYPES

#### GYRALITES—for head-end

SEALED BEAM: 2 and 3-lamp models with new, improved long horizontal beam movement for more effective coverage of right-of-way and approaches to grade crossings. Red-white combination or white only. Color change with automatic or manual controls.

REFLECTOR AND SEALED BEAM COMBINATION: Red single-sealed beam lamp mounted in center of 16-inch silvered glass or Alzak reflector plus a clear medium screw base lamp. Color change with automatic or manual controls. For white beam, only a full-surface reflector replaces the sealed beam lamp.

Other styles for front and rear of train are available.



twin sealed beam unit

#### HEADLIGHTS

**SEALED BEAM:** Available in all mounting styles for flush, semi-flush and surface mounting on diesel and steam locomotives. Single and twin sealed beam lamp adaptors for converting reflector types now in use.

REFLECTOR: Choice of silvered glass or Alzak reflectors, medium seriew base or medium prefocused base lamp sockets.

#### BACK-UP AND TRACK INSPECTION LIGHTS

SEALED BEAM, REFLECTOR, AND STEPPED LENS TYPES: Available in a variety of mounting styles with wing nut-latched hinged door. Combination Gyralite and back-up light for permanent or portable mounting.

Write for complete information on Pyle-National's extensive line of functional lights for railroad rolling stock, which includes classification lights, marker lights, locomotive number lights, and gauge lights



Rear-of-train



Gyralite and back-up light



Track inspection back-up or headlight

#### THE PYLE-NATIONAL COMPANY

1359 North Kostner Avenue, Chicago 51, Illinois

Branch offices and Agents in the Principal Cities of the United States « Canadian Agent: The Holden Company, Ltd., Montreal Export Department: International Railway Supply Company, 30 Church St., New York

TRAIN LINE CONNECTORS . STAND-BY PLUGS AND CABLE CONNECTORS . TURBO-GENERATORS . PLOODLIGHTS . CONDUIT FITTINGS . MULTI-VENT



### -ADVERTISERS IN THIS ISSUE-

Adams & Westlake Company, The Agency—Heari, Hurst & McDonald, Inc.	36	Linde Air Products Company, a Division of Union
Air-Maze Corp. Agency-The Griswold-Eshleman Co.	24	Carbide and Carbon Corporation 40 Agency—J. M. Mathes, Inc.
Air Reduction Sales Company Agency—G. M. Basford Co.	6	MacLean-Fogg Lock Nut Company Agency—W. S. Kirkland Advertising  33
Alco Products, Inc. 28, Agency—Hazard Advertising, Inc.	29	Magnaflux Corporation 9 Agency—Stockel & Associates, Inc.
American Hair & Felt Co. Agency-Oscur P. Holtzman Advertising	42	Magnus Chemical Co., Inc. 92  Agency—Brudao & Bailey
American Pamcor, Inc. Agency—Russell-Berger, Inc.	95	Magnus Metal Corporation 54, 104 Agency-Marsteller, Richard, Gebhardt, & Reed, Inc.
Armco Steel Corporation Agency—N. W. Ayer & Son, Inc.	22	Met-L-Wood Corporation 26 Agency—Armstrong Advertising Agency
Archer Daniels Midland Co.	43	Miller Lubricator Agency-Kerker-Peterson Hison-Hayes 100
Agency—The Alfred Colle Co.  Association of Manufacturers of Chilled Car Wheels  Agency—Schuyler Hopper Co., The	97	Miner, Inc., W. H. Front Cover Morton Manufacturing Company 102
Buffalo Brake Beam Company Inside Front Co	ver	Agency-W. S. Kirkland Advertising
Bullard Co., The Agency-Park City Advertising Agency	41	National Aluminate Corporation Inside Back Cover
Burlington Refrigerator Express Company	11	National Carbon Company, A Division of Union Carbide and Carbon Corporation 99
Chicago Pneumatic Tool Company Agency-G. M. Basford Co.	46	Agency—William Esty & Co.  National Malleable and Steel Castings Company 20, 21
Columbia Geneva Steel Division, United States Steel Corporation	~	Agency-Palm & Patterson, Inc.
Agency Batten, Barton, Durstine & Osborn, Inc.	/	National Tube Division, United States Steel Corporation 7
Dana Corporation Agency—Clifford A. Kroening, Inc.	87	Agency-Batten, Barton, Durstine & Osborn, Inc.
	85	Oakite Products, Inc. 1 Agency-Marsteller, Richard, Gebhardt & Reed, Inc.
Demp-Nock Co., The	100	Pyle-National Company, The 113
Duff-Norton Company Agency-Band & Starr, Inc.	94	Safety Car Heating and Lighting Company, Inc., The 25
Elastic Stop Nut Corporation of America	27	Agency—J. C. Bull, Inc. Simplex Wire & Cable Co. 106
Esso Standard Oil Company	101	Agency Henry A. Loudan, Inc.
Agency McCann-Erichson, Inc.  Ex-Cell-O Corporation Agency Holden, Chapin Larue, Inc.	37	Sinclair Refining Company 30, 31 Agency—Morey. Humm & Johstone, Inc.  Sperry Rail Service, Division of Sperry Products, Inc. 98
Exide Industrial Division-Electric Storage Battery		Agency-Hazard Advertising Company
Co., The Agency-Gray & Rugers	2	Stackpole Carbon Company
Fruit Growers Express Company	11	Standard Car Truck Company 32 Agency—Stuart Potter Co.
Garlock Packing Company, The Agency—Hutchins Advertising Co., Inc.	110	Standard Railway Equipment Manufacturing Company 8
Garrett Corporation, The Agency-J. Walter Thompson Company	13	Agency Clinton E. Frank, Inc. Stran-Steel Corporation, Unit of National Steel
General Electric Co.  Agency—G. M. Basford Company  General Steel Continues	45	Corporation 39 Agency—Campbell-Ewald Co.
General Steel Castings Agency—Oakleigh R. French & Assoc.	17	Sweeney Mfg. Co., B. K.  Agency—Curt Freiberger & Co.  100
Griffin Wheel Company Agency—Erwin, Wasey & Co.  34,	35	Texas Company, The Agency—Erwin, Wasey & Company, Inc. 50
Gulf Oil Corporation  Agency—Young & Rubicam, Inc.	91	Timken Roller Bearing Company, The Back Cover
Hennessy Lubricator Co., Inc.	37	Agency-Batten, Barton, Durstine & Osborn, Inc. Toledo Pipe Threading Machine Co., The
Holland Company Agency-Van Auken, Ragland & Stevens	89	Agency-The Jay H. Maish Co.
Hyatt Bearings Division of General Motors  Agency—D. P. Brother & Co., Inc.	93	United States Steel Corporation, United States Steel Export Company Agency—Batten, Barton, Durstine & Osborn, Inc.
Ingersoll-Rand Agency-Marsteller, Nickard, Gebhart & Reed, Inc.	111	Unit Truck Corporation Inside Front Cover
Y all a come and a second	105	Van Der Horst Corp. 96
International Nickel Company, Inc., The Agency—Marschalk & Pratt Co., Inc., Div. of McCam-Erickson, Inc.	5	Waugh Equipment Company 19 Western Fruit Express Company 11
Agency Marschala & Fratt Ca., Inc., Div. of McCann-Erickson, Inc.		Western Fruit Express Company 11 Westinghouse Air Brake Company 52, 53 Agency—Butten, Barton, Durstine & Osborn, Inc.
International Steel Company Agency—W. S. Kirkland Advertising	47	Agency—Butten, Barton, Durstine & Osborn, Inc. Wine Railway Appliance Co., The Agency—T. J. Stead, Advertising
Journal Box Servicing Corporation	23	
Joy Manufacturing Company Agency-W. S. Walber Advertising, Inc.	103	Agency-Humbert & Jones
Klockner-Humboldt-Deutz A. G. Koln-Deutz	38	Wyandotte Chemicals Corporation 48, 49 Agency-Brooke, Smith, French & Darrance, Inc.
Lewis Bolt & Nut Company Agency—E. T. Holmgren, Inc.	107	Yuba Mfg. Co. Agency—George C. McNutt Advertising

"This index is an editorial feature maintained for the convenience of readers. It is not a part of the advertiser's contract and Railway Locomotives & Cars assumes no responsibility for its correctnoss."

#### Proved Protection - Approved by Locomotive Builders

TREATMENT
Protects Diesel
Cooling Systems
Against Scale
and Corrosion

Users Choice of Liquid, Pellet or Pulverized Form

Important to your diesel engine availability! Cooling systems can't help but scale and corrode without adequate chemical protection.

*Nalco* has the effective and economical treatment you want...whether you prefer liquid, pellet, or pulverized form. Chromate as well as non-chromate type treatments are available.

Use these proved *Nalco* non-foaming treatments with complete safety... they provide outstanding metal protection without damage to any of the non-metallic parts—like gaskets or hose—in the cooling system.

Complete details sent promptly upon request. Call your *Nalco* Representative, or write direct.

#### NATIONAL ALUMINATE CORPORATION

6190 West 66th Place

Chicago 38, Illinois

In Canada: Alchem Limited, Burlington, Ontario

halco

PRODUCTS . . . Serving the Bailroads through Practical Applied Science



## THE <u>TAPER</u> MAKES TIMKEN<sup>®</sup> THE ONLY JOURNAL BEARING THAT <u>DELIVERS</u> WHAT YOU EXPECT WHEN YOU BUY A ROLLER BEARING

YOU put car journals on roller bearings for only two reasons: to end the hot box problem and to cut operating and maintenance costs to a minimum. Timken\* tapered roller bearings are the only bearings that do both. It's the taper. Here's why:

1. NO LATERAL MOVEMENT WITHIN THE BEARING. Timken bearings roll the load. They never slide it. There's no scuffing of rollers and races to shorten bearing life. No lateral movement to force lubricant through the seal, out of the journal box, and onto the rails to cause costly diesel locomotive wheel slip. You save the cost

of lost lubricant, plus its replacement

2. POSITIVE ROLLER ALIGNMENT. The taper in Timken bearings holds ends of rollers snug against the cone rib, where wide area contact keeps them properly aligned. There's no skewing of rollers to upset full line contact.

Unlike costly devices that merely act as "crutches" in an attempt to improve friction bearing performance, Timken bearings do away with the cause of hot boxes—the friction bearing itself. What's more, they bring maximum operating and main-

tenance savings. Fact is, the new heavyduty type AP (All-Purpose) Timken journal bearing assembly will go three years without adding lubricant. Lubricant cost is cut as much as 95%. Terminal bearing inspection time is reduced 90%.

So, to end the hot box problem and slash operating and maintenance costs to the minimum, be sure you get Timken tapered roller bearings. The taper makes them deliver. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "Timrosco".

7 out of 10 roller bearing freight cars roll on TIMKEN tapered roller bearings

